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AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XIV MAY 18, 1925 NUMBER 8

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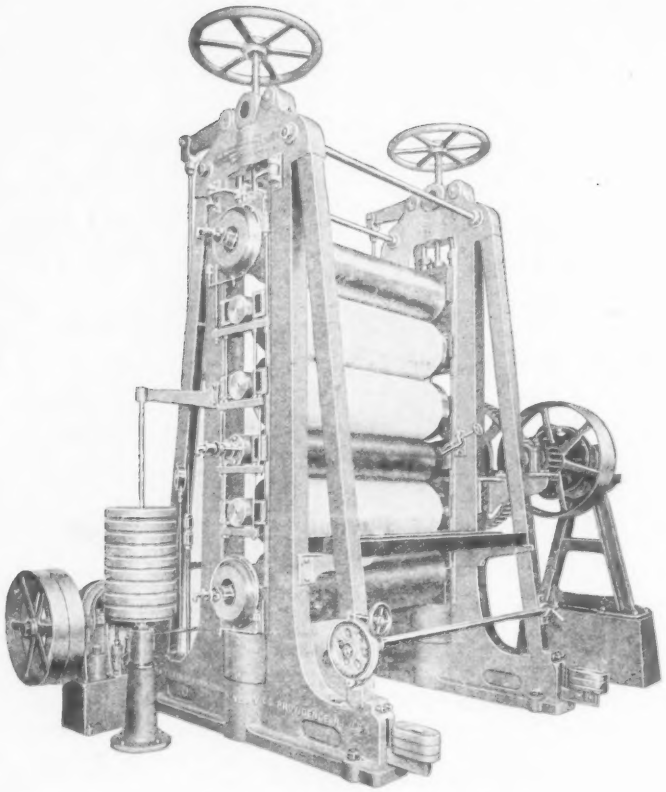

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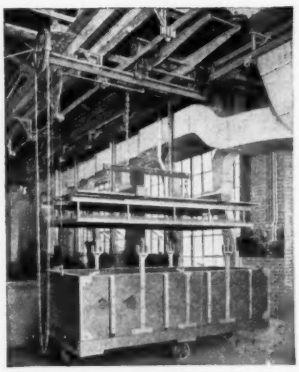

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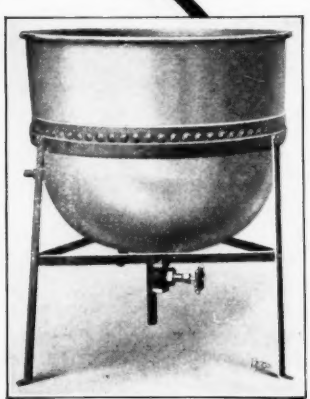

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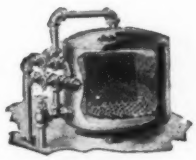

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VOLUME XIV NEW YORK, MAY 18, 1925 NUMBER 8

Several Color Reactions on Wool

Treatment of Wool with Quinone—Action of Neutral Nitrite of Sodium or Alkaline Nitrite on Wool—Actions of Solutions of Mercury in Nitric Acid

By I. MEUNIER and G. REY

Revue Generale des Matieres Colorantes, 1925, *page* 66-67.

(*Translated by Ismar Ginsberg, B.Sc., Chem. Eng.*)

IN 1909, Meunier showed (see French Patent No. 419,797) that if neutral wool was subjected to the action of solutions or vapors of quinone, it became dyed a violet red and acquired a very marked resistance to the action of boiling water. Hence, such a colored fabric can stand up well against any of the accidents that may happen during the process of felting. It was found that such a wool could stand up well against tension; its dyeing properties were, moreover, enhanced materially, so that the appearance of the wool was particularly brilliant.

These results have been utilized in an industrial manner since 1909, in particular for the treatment of paper-making felts and wools used for knitted wear.

The treatment of the wool by means of quinone can be carried out with the chemical either in the liquid or vapor phase. An investigation was made on the nature of the action of quinone vapors, and it was found that the fixation of the quinone on the wool, and in consequence the obtaining of a characteristic reddish violet color, can take place only in the presence of traces of moisture.

Practical experience has proved this to be so. For example, a test was made in which a sample of dry wool was introduced into two glass tubes. Through one of these a current of dry air was passed, the air being dried by bubbling through concentrated sulphuric acid, and then loaded with vapors of quinone by being made to pass through a flask which contained several crystals of this substance at a slightly elevated temperature. A current of air was passed through the second of the two tubes and in this case the air was not dried. Or better still a current of air that had first been moistened by bubbling through water and then loaded with quinone vapors was employed. The wool in the first tube did not fix the quinone and did not color, while the wool in the second tube combined with the quinone and was colored violet.

It is probable that the presence of water is rendered necessary for the hydrolysis of the protein groups, R-CO-NH-R', and to allow the formation of free NH_2 groups which are able to combine with the quinone.

The reddish violet color that neutral wool assumes in the presence of quinone can be materially modified when the wool is first subjected to the action of light. A woolen fabric which has been kept away from the light for several days or even subjected for one hour to the action of the ultra-violet rays assumes a dark brown color when placed in contact with an aqueous solution of quinone. The contrast between the reddish violet color which is developed on wool, which has not been kept away from the light, and the deep brown color that is obtained under the above-named conditions is sufficient to enable a design to be reproduced on the fabric, provided the former is not too complicated. In this phenomenon there is to be found the explanation of certain anomalies which have been observed in dyeing practice when the woolen fabrics had first been exposed to the direct rays of the sun in order to dry them before dyeing.

Wools that have an acid reaction fix the quinone at a rate which decreases the higher the acidity of the wool. The color is also affected in a similar manner by the presence of the acid in the wool and the amount of it in the fiber.

Wools that have an acid reaction and which have first been subjected to the action of the ultra-violet rays become colored immediately with a clear yellow color when subjected to the action of an aqueous solution of quinone.

Wools that have been bleached with the aid of sulphurous acid fumes are exceptions to this rule, and become bright yellow in color without first being subjected to the action of the sun's rays when they come in contact with quinone. This is an extremely definite reaction which allows of rapid recognition of the fact

that a wool has or has not been bleached with the aid of sulphur dioxide.

Wools with an acid reaction which have been subjected to the action of the ultra-violet light react therefore with quinone in the same manner as wool that has been bleached with sulphur dioxide. It is likely that the sulphur in the wool is partially oxidized by the action of the ultra-violet rays.

Wools that have been bleached with sulphur dioxide and then treated with a solution of sodium bicarbonate assume their characteristic violet-rose color when brought into contact with quinone.

The action of the ultra-violet light on the wool is absolutely independent of the surrounding atmosphere; it is the same in an atmosphere of carbon acid gas or of nitrogen, as well as in air.

The coloration of wool with quinone is much more rapid than the reaction which takes place with the aid of the same chemical on silk. This allows the use of this reagent rapidly to determine the composition of mixed textiles.

Action of Neutral Nitrite of Sodium or Alkaline Nitrite on Wool

The action of nitrous acid or of nitric acid containing hyponitric acid vapors on wool has been known for a long time. It was studied in particular by Vignon and Sisley (Bulletin du Laboratories d'Etudes de la Soie de Lyon, 1891). On the other hand, the action of a neutral solution of nitrite of soda or an alkaline solution of this salt on wool has not been studied or published, so far as our knowledge is concerned, up to the present time.

Wool, either in the raw or bleached condition, is plunged into a solution of sodium nitrite, either in the neutral or alkaline condition. The wool does not change color even when it is dried in air at the ordinary temperatures. But if the wool is first impregnated with nitrite and dried in air and then heated in a drying oven to a temperature of 100 deg. Cent., the color of the fibers is changed to a yellowish orange. The heating process lasts for several hours.

If the wool fibers are first impregnated with a neutral or alkaline sodium nitrite solution and then dried at the ordinary temperatures, and thereafter subjected to the action of the ultra-violet rays, its color is changed very rapidly and it assumes a yellowish orange shade. It was also found that the color change induced in this manner was more rapid when the nitrite solution was alkaline than when it was neutral. A very characteristic reaction was found to take place when an alkaline solution of tyrosine, to which sodium nitrite was added, was subjected to action of the ultra-violet rays, the color being exactly the same as obtained when the woolen fiber is treated with nitrite alone.

Then again if a woolen material that has been bleached with the aid of sulphurous acid fumes is impregnated with a neutral solution of nitrite of soda, which wool has, of course, a slight acid reaction due to traces of the sulphur dioxide left behind in it, it is found, that, after the sample has been dried, the action of the ultra-violet rays is slower and the yellowish orange color develops more slowly than when a neutral wool sample is employed.

Action of Solutions of Mercury in Nitric Acid

It is well known that Millon's reagent reacts on wool for the reason that it contains in its molecule the tyrosine ring. Millon's reagent is made by dissolving one part of mercury in two parts of 40 deg. Be. nitric acid and can be considered as an acid solution of mercuric nitrate containing nitrous acid.

It is likewise known that in the operations in which solutions of mercuric nitrate are employed for treating hair, the latter assume all kinds of colors in which yellow predominates. The solutions of mercuric nitrate employed for this purpose are made in the following manner:

In the first place, for making what is known as "secrete yellow," 18 parts of mercury are dissolved in 100 parts of commercial nitric acid, and then, according to the conditions of the operation, it is diluted to a concentration of 9 to 12 deg. Be. This "secrete yellow" solution is used on colored nap. The second solution is known as "secrete pale" and is made by dissolving 32 parts of mercury in 100 parts of commercial nitric acid, and diluting to a concentration of from 9 to 12 deg. Be. according to the needs of the operation. This solution is employed on white nap.

A general study has been made of this matter, and the following conclusions have been reached which will be of interest to the reader.

In the first place, due to the absence of any trace of nitrous acids, solutions of mercury in nitric acid will not color wool, silk or hair. Then again, in the presence of small quantities of nitrous acid, wool, silk and hair become red in color, but the quantity of acid required for this coloration is greater in the case of the hair than it is for the wool, and greater for the silk than for the hair. The reddish coloration obtained in this manner is not destroyed when the fiber is kept in the reagent for a long time.

On the other hand, if the quantity of nitrous acid in the mixture is increased a little, the result is that at a certain time the reddish coloration is no longer stable, as the fiber is allowed to remain in the solution. It then changes to a yellowish brown. If the reagent contains a large excess of nitrous acid, the reddish coloration does not appear at all and a yellow shade is immediately formed on the fiber.

The red coloration that may be formed with this reagent on both silk and wool fibers may be obtained in the following manner: In the case of silk (a mass of silken fibers, which weighs in the neighborhood of 1 to 2 decigrams, is introduced into a solution of corrosive sublimate (mercuric chloride). About 15 c.c. of the mer-

cury solution are employed at a concentration of 7 per cent. The mixture is then heated on the water bath for a period of 10 minutes and then there are added 10 drops of a solution of nitrite of sodium at a concentration of 25 per cent. A red color is produced on the silken fiber in this manner within a few moments after the fiber becomes impregnated with the solutions. Furthermore, the color that is formed is very stable.

In the case of wool the process employed is practically the same. One exception is that the wool is maintained in the hot solution of bichloride of mercury for a period of 25 to 30 minutes, instead of only 10 minutes as in the case of silk, and then 5 drops of the nitrite of soda solution are added.

It has been shown above that the color reactions carried out on wool fibers are often affected by the degree of acidity of the latter. This is particularly true of those woolen fibers that are bleached with the aid of sulphurous acid fumes. It may therefore be of some interest to describe here the method employed in determining the percentage of acid in the woolen fiber. The method which the authors used and which gave satisfactory results is as follows:

About 5 grams of wool are introduced into a grinding apparatus along with 200 c.c. of a one-twentieth normal solution of sodium bicarbonate. The wool is allowed to remain in contact with this solution for a period of 24 hours, and during this period the mass is stirred from time to time. Then the solution is decanted. The wool is rinsed with 50 c.c. of neutral distilled water, the operation being repeated four times. Then the wash waters are united and 30 c.c. of one-fifth normal sulphuric acid solution are added, the mixture is brought up to the boiling temperature, and the acid is titrated back with the aid of one-fifth normal sodium carbonate solution in the presence of phenolphthalein.

In applying this method to wools which have previously been neutralized by washing with a twentieth normal solution of sodium bicarbonate, then with neutral distilled water, and on which the following quantities of sulphuric acid have been fixed, viz., 1.0, 1.3, 1.9, 2.4, and 2.5 parts per hundred, the analysis gave the following figures: 1.1, 1.4, 1.9, 2.6 and 2.6.

Dyeing Acetate Silk

Part V

(*Continued from page 281*)

Dyeing Acetate Silk with Acid and Mordant Dyes—Azo Dyes—Methods for Dyeing on Unions and Lustron

By CHAS. E. MULLIN, M. Sc., F. A. I. C.

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ACETATE SILK has no affinity for most acid dyes, but some of them, particularly those which do not contain sulphonic acid groups or only one sulphonic group which may be counteracted by the presence of other groups, are applicable. In British Patent No. 182,830, September 30, 1921, and No. 182,844, September 11, 1921, Clavel theorizes that the affinity of dyes for acetate silk is due to the presence of certain active groups which, in the absence of sulphonic groups or if preponderating over, say, one sulphonic group present, are capable of dyeing acetate silk. He attempts to classify the dyes and radicles on this basis in the order of their numerical precedence regarding their basic or acid influence on the dye molecule; but so many factors, such as the orientation of the radicle in the molecule, the size of the molecule, the state of aggregation, etc., enter into the matter that it is rather difficult to make a general rule covering the affinity of dyes for acetate silk.

He states that dyes of any class containing hydroxyl, amino, imino, imido, nitro, nitroso, isonitroso, acidylamino or azo groups, and either no sulphonic groups or not more than one sulphonic group together with two or more of the above groups, are suitable for dyeing acetate silk. These patents also cover the use of salts, such as magnesium chloride, stannous chloride or zinc chloride, which are capable of forming double salts with the dyestuff in applying basic dyes to acetate silk. The dyestuffs in the form of these double salts may also be used to give colors fast to light and washing. The use of an after-treatment consisting of acetic or formic acid and an olive oil soap emulsion is suggested. Suspensions of Induline are also suggested for dyeing acetate silk. Recent articles in the Revue Generale des Matieres Colorantes have extended and modified Clavel's theory.

Acetate silk has no affinity for the usual mordants, but many mordant dyes may be applied to it without a mordant by virtue of their phenolic and ketonic functions. However, the shades are often entirely different from those obtained when applied on a mordant. They are sometimes dyed from a bath containing only soft water. Some of these dyes change color on treatment with soap, but the original color usually returns on acidification. Alizarine Orange AO (nitroalizarine) is a very useful member of this series. Alizarine Garnet is not much changed by soaping. Alizarine Green S and Alizarine Blue S and ABS are also used, the former for gray and the latter for a light fast reddish blue.

Emmons states that true alizarine may be dyed on acetate silk from a bath of pure water only. Khaki Yellow WN gives shades of good fastness from a salt bath. Acids weaken the shade. Alizarine Yellow WS is useful for gold shades and in combination with other acid dyeing colors. It has good fastness and is particularly fast to light. It is applied with acetic acid and salt. Orange IV is fast to light, alkalies and rubbing, but is sensitive to acids. Metanil Yellow Y has a fastness similar to Orange IV. It is dyed from a salt bath. Anthracene Brown WL is useful for olive yellows. Appied with acetic acid and salt, as in Method No. 15, it has good fastness, particularly to light. It is dulled by alkalies.

Alizadine Orange M past is dyed with salt and has good fastness. Citronine Y Conc. gives bright golden yellows in a neutral bath. It has good fastness, but becomes orange in light. Cloth Reds are useful for fast pinks and may be applied with other neutral or acid dyeing colors. Acid Rhodamine 3R, Coomassie Fast Violet 10 BP, and Indian Yellow GA or Azo Yellow A5W are also used. They are applied with acetic acid or 10 to 15 per cent of salt, as in Method No. 15. The Coomassie Fast Violet is only moderately fast to light and the Indian Yellow reddens in shade but is fast. Acid Rhodamine is fairly fast. The following dyes may also be appied to acetate silk by Method No. 14 or 15, but are particularly fast, especially to light: Era Chrome Olive, Omega Chrome Black PV, Orange G, Orange II, Alizadine Brown M, Anthracene Acid Brown B, Fast Red A, Naphthylamine Brown, Quinoline Yellow, Archil Substitute and Alizarine Maroon. Really fast acid reds and blues are wanting.

The following acid and chrome dyes may be applied by Method No. 14, in the same manner as the basic dyes, or by Method No. 16: Azo Yellow Conc., Acid Alizarine Gray B, Amido Yellow E, Alizarine Direct Blue SE, Orange IV, Alizarine Direct Violet R and ER, Autochrome Olive Brown G Conc., and, of course, Chrome Blue BMI Conc. These acid dyes, as well as Acid Alizarine Gray B and Autochrome Olive Brown G, are of good fastness to washing, and are fast to acid with the exception of Orange IV and Autochrome Olive Brown G, which change shade temporarily. This also applies to Victoria Yellow O, which gives a fine yellow fast to light on acetate silk. Alizarine Yellow 2GW and RW may also be applied to acetate silk without after-chroming, but do not give full shades. Orange II, Brilliant Orange O and G, Scarlet for Silk O and Fast Red O give fairly full shades on acetate silk, but are not very fast to light. Amido Yellow E, Orange IV, Alizarine Direct Violet R and ER, and Alizarine Direct Blue SE are particularly fast to light, while Azo Yellow, Acid Alizarine Gray B and Autochrome Olive Brown G are very good. Chrome Blue BMI is very fast to washing and light, but should not be used in quantity in combination with other dyes. The Lustron Company states that Chrome Orange R, also known as Alizarine Yellow R and Alizarol Orange R, and Pontachrome Yellow 3R may be applied by Method No. 15. Certain basic dyes, such as Victoria Green WB and Methylene Green B, may be used in the same bath with many chrome dyes. When basic dyes are applied in the same bath, the salt should not be added to the bath until the basic dye is exhausted.

The British Dyestuffs Corporation, J. Baddiley, J. Hill and E. B. Anderson, obtained British Patent No. 202,157, July 29, 1922, on dyeing acetate silk by means of aminoazo and aminoazo substituted dyes containing one or more carboxylic groups but with no sulphonic groups, the amino groups being diazotizable. In this manner dyestuffs which were formerly solubilized by means of the sulphonic group, and therefore had no affinity for acetate silk, are rendered soluble without the sulphonic group and have an affinity for acetate silk, giving direct shades. In this manner such compounds as *m*-amino-benzoic acid plus *o*-anisidine; *p*-aminosalicylic acid plus *a*-naphthylamine; 5-acetylamino-2-amino-4-methoxytoluene plus *B*-hydroxynaphthoic acid (hydrolyzed); and *m*-aminobenzoic acid plus 1, 2-aminonaphthylamine ether were solubilized without the presence of sulphonic acid groups. These dyes may also be diazotized on the fiber and developed with the usual components, such as the naphthols, etc. The shades produced are similar to those of the corresponding Ionamines.

British Patent No. 207,711, December 21, 1922, to the British Dyestuffs Corporation, J. Baddiley and W. W. Tatum, covers the use of anthraquinone dyes containing carboxylic groups but no sulphonic groups. Suitable dyes are those obtained by condensing salicylic acid *p*-sulphonyl chloride with diaminoanthraquinones as described in British Patent No. 201,610, or by condensing haloanthraquinones with a suitable aminocarboxylic acid such as anthranilic acid. The dyeing is effected in a neutral or slightly alkaline bath, with subsequent addition of salt or acids. Blue shades unobtainable from azo compounds were produced by these products. They have the excellent fastness to light and washing common to the anthraquinone dyestuffs. In this manner 1, 5-dichloranthraquinone with anthranilic acid dyes acetate silk directly a reddish-violet shade. 4-Brom-1-methylamino anthraquinone with anthranilic acid gives direct reddish blue shades; while dichloranthrarufin with anthrainlic acid gives greenish blue shades.

Azo Dyes

The azo dyestuffs include many acid, direct cotton and mordant wool dyes, and the basic character of the azo grouping renders some of these dyes suitable for dyeing acetate silk. However, those containing sulphonic acid groups, such as Benzopurpurin 4B, Chlorazol Black E Extra and Diamine Black BH are not suitable. Fat-soluble Orange (diazotized aniline coupled with *B*-

naphthol) and Alizarine Yellow R (diazotized *p*-nitraniline coupled with salicylic acid) dye acetate silk satisfactorily. In the case of Metanil Yellow, Orange IV, Silk Ponceau G (diazotized *B*-naphthylamine monosulphonic acid coupled with *B*-naphthol) and Brilliant Orange G (diazotized aniline coupled with *B*-naphtholmonosulphonic), the adverse action of the sulphonic acid group is partially overcome. Diazo dyes such as Pyramidol Brown BG and Bismarck Brown may be used, but in the latter the high molecular weight appears to diminish its affinity for acetate silk.

Some sulphonated azo dyes, chiefly yellows, oranges and reds (Roccelin) may be dyed directly on acetate silk. Clavel suggested the addition of small quantities of aniline hydrochloride to the dye bath when dyeing the simple mono-azo acid dyes. Certain azo dyes which contain no sulphonic acid groups but are slightly soluble in water, such as Terra Cotta RS and Azochromine and their equivalents, are useful. Azo Yellow I and Metanil Yellow are fast to light, the former being used as a bottom for emerald and jade greens, topped with basic green or blue. Alizarine Yellow 3G and Alizarine Orange R are azo-salicylic acid derivatives which do not contain sulphonic acid groups. They may be applied by Method No. 15, and can be after-treated with chrome if desired. Azo Chromin gives a brown and there are other azo browns which give more or less fast shades after fixing by a chrome treatment. Alliance Fast Brown 5G paste has exceptional fastness to light and good fastness to acids, alkalies, washing and rubbing. Brotherton's Metachrome dyes are useful. Rose Pink CA58 belongs to this class, while Chromocitronine, Chromoxanthine and Chrome Deep Brown RR are also used.

Nitro dyes such as Picric Acid and Martius Yellow may be used on acetate silk, but the shades are not of much importance. As Naphthol Yellow S is a sulphonated nitro dye, it is of no use. The Nitroso dyes, Gambine Y and Alsace Green, are obtained by the action of nitrous acid on resoncinol and B-naphthol. Hall states that they are absorbed by acetate silks, but have little tinctorial power except as iron lakes, and as the acetate silk loses luster when treated with metallic mordants, they are of little value for practical work. A selected list of acetate silk dyes, possibly mostly acid, basic and mordant dyes, are marketed under the Cellutyl and Cellutyl Fast brands. Many of these dyes may be used in the same bath with the direct cotton dyes on acetate silk-cotton unions. Some Cellutyl dyes stain cotton or artificial silk only slightly or not at all; among these are included Cellutyl Yellow C, Cellutyl Fast Yellow AY and B, Cellutyl Fast Tangerine Cellutyl Fast Orange G and R, Cellutyl Fast Golden Orange, as well as Ionamine B, H, L, and A.

Method No. 30: Dyeing Acetate Silk with the Aid of Ammonium Chloride to Exhaust the Bath.—Another method of applying acid mordant and basic dyes which resembles Method No. 16, is to use a 20:1 dye bath containing 15 to 30 per cent ammonium chloride, according to the amount of dye used, to accelerate the exhaustion. Obviously this method is more suited for use with dyes of the acid and acid mordant type than with the strongly basic dyes. The goods are entered at 40 deg. Cent. (105 deg. Fahr.), the ammonium salt added and the temperature gradually raised to 71 to 74 deg. Cent. (160 to 165 deg. Fahr.) for one hour. The goods are then rinsed and soaped for ten minutes at 25 to 30 deg. Cent. (77 to 85 deg. Fahr.) in a bath containing two pounds of soap per 100 gallons of liquor.

This method is particularly recommended in dyeing cotton-acetate silk unions with direct dyes, and the acetate silk with the dyes given below. The dyes marked * will stain the cotton slightly in the case of full shades and are therefore more suitable for use where the cotton is to be dyed dark shades.

*Azo Yellow Conc.
Amido Yellow E
Victoria Yellow O
Auramine O
*Orange IV
Brilliant Orange O and G
Scarlet for Silk O
Fast Red O
Rosazeine B Extra
Autochrome Olive Brown G Conc.
Alizarine Direct Violet R
*Alizarine Direct Violet ER
*Alizarine Direct Blue SE
*Alizarine Direct Blue A
*Acid Alizarine Gray B

It has also been suggested that these dyes be applied with 10 to 15 per cent salt and a small amount of acetic acid as in Method No. 15.

Method No. 31: The "Acetate" Dyes.—The "Acetate" brand of dyes for acetate silk has been advertised in Canada, but nothing was given regarding their composition. These dyes are possibly a collection of basic, acid and mordant dyes, and they are applied in a 20 or 30 to 1 dye bath containing 10 to 15 per cent Glauber salt and 4 to 6 per cent of 30 per cent acetic acid at 60 to 71 deg. Cent. (140 to 160 deg. Fahr.) for three-quarters to one hour. This method applies to all Acetate dyes except Acetate Brown O, which must be dyed without acid but with 15 to 20 per cent of Glauber salt. All Acetate dyes may be mixed in the same bath. After dyeing rinse well and dry at 49 to 60 deg. Cent. (120 to 140 deg. Fahr.) The Acetate dyes are claimed to give quite full shades on acetate silk and to have the usual fastness to water and washing. Their fastness to light is good with the exception of Acetate Red A, which is inferior to the others. They may be topped with basic dyes according to the following formula.

Method No. 32: Topping Acetate Dyes with Basic Dyes.—Enter the rinsed acetate silk in a 30 or 40 to 1 dye bath containing 1 to 2 per cent of 30 per cent acetic acid

and dye at 60 deg. Cent. (140 deg. Fahr.). Rinse well and dry, or the shade may be brightened by soaping.

Dyeing Acetate Silk—Cotton Unions with Acid and Mordant Dyes

Many of the acid and mordant dyes may be applied to acetate silk-cotton unions by Method No. 15. The Lustron Company states that Acid Rhodamine 3R, Azo Yellow A5W or Indian Yellow GA, Coomassie Fast Violate 10BP, Chrome Orange R, also known as Alizarine Yellow R or Alizarol Orange R, Pontachrome Yellow 3R, Alizarine Yellow 2G or equivalent, Alliance Fast Brown 5G, Terra Cotta RS, Anthracene Browns and Blues as well as Modern Violet and Violet PDH or Prune Pure may be used for this purpose. Many of the basic dyes may be used with them, for instance, Alizarine Yellow R and either Victoria Green WB or Methylene Green B may be applied in the same bath by Method No. 15 to obtain a light fast green. When using a basic dye with a mordant dye, it is best not to add any salt to the dye bath until after the basic dye has been exhausted therefrom, unless it is desired to restrain the rate at which the basic dye feeds on to the acetate silk, as salt has a marked retarding action on the basic dyes for acetate silk. Possibly a better way would be to apply the basic dye first cold, with or without salt and acetic acid; then when the bath is exhausted the mordant dye may be added to the bath and the dyeing continued to shade. With most mordant dyes a chrome treatment is of no particular benefit.

Method No. 33: Additional Treatment for Clearing Cotton in Unions.—Many of these dyes stain the cotton in unions somewhat, but it may be cleared by treatment with an acetic acid solution, either hot or cold as in Method No. 18. If this it not entirely effective, it may be followed by a soap bath containing about 1.25 gr. per liter of olive oil soap at about 45 deg. Cent. (113 deg. Fahr.).

Method No. 34: Another Treatment for Clearing Cotton in Unions.—In certain cases where one or two hot acetic acid treatments, as in Method No. 18, does not clear the cotton, it may be given a final cold treatment in a bath containing 1 per cent sodium bicarbonate and 1 per cent of soap, on the weight of the goods, for 15 minutes at about 45 deg. Cent. (113 deg. Fahr.).

Method No. 35: Clearing Cotton in Acetate Silk-Cotton Unions.—Another method of clearing the cotton in acetate silk-cotton unions is to give the union a very mild cold bleach similar to Method No. 11, but of only about half this strength, after the soaping as in Methods No. 33 or 34. After this bleach, the goods should be neutralized as usual.

Clavel recently secured United States Patent No. 1,517,709, December 2, 1924, upon a method of dyeing fabrics containing acetate silk effects either in solid shades or two-color effects. In this process the material containing cotton, etc., is dyed in a bath containing a benzidine or other dye having a selective action upon the other fiber, but incapable of dyeing acetate silk directly, and then subjecting the union to a separate treatment with a dye such as induline with acetic acid, which will dye cellulose acetate directly.

Method No. 36: Alizarine Red on Lustron for Gold Color.—Alizarine Red Pastes 20 per cent, Y and B Shades may be used to obtain either a gold or a purple on Lustron, depending upon how it is applied. For a gold shade, prepare the dye bath with 4 per cent Alizarine Red Y, 2 per cent tannin, 1 per cent acetic acid and 2 per cent salt, and dye for a full hour at 80 deg. Cent. (175 deg. Fahr.) If the color is too glary, it may be dulled or browned somewhat by substituting potassium bitartrate (cream of tartar) for the acetic acid above; or run cold after dyeing in a solution of 1 pound soda ash and 1 pound soap in 120 gallons of water until the desired brown is obtained. Where this method of dyeing is applied to acetate silk-cotton unions, it may be necessary to clear the cotton by a combination of Methods Nos. 18 and 30.

Method No. 37: Alizarine Red on Lustron for Purple.—For a purple on Lustron, use 2 per cent Alizarine Red and just enough acetic acid so that the dye bath will stay orange and not red when hot. Dye for one hour at about 80 deg. Cent. (175 deg. Fahr.) and then treat the goods at the same temperature with 5 per cent of Turkey Red oil (soda), slightly overneutralized with ammonia. This treatment should be continued until the silk comes to its final shade, or if this shade is obtained rather soon, for at least one-half hour in order that the color shall be fully developed through the fiber and keep its shade on drying. This Turkey Red oil treatment will also clear the cotton in acetate silk-cotton unions.

Method No. 38: Alizarine Violets and Browns on Lustron.—Alizarine Violet 2BS and Z4B, and Alizarine Browns such as the ZW marks, are dyed on Lustron with a small amount of acetic acid and salt as in Method No. 15. The progress of the dyeing can be determined by spotting the goods with a little ammonia as the color does not develop in the acid bath. After the goods are dyed, they are rinsed and then developed with Turkey Red oil and ammonia, as in Method No. 37.

Method No. 39: Alizarine Blue on Lustron.—Alizarine Blue S is applied to Lustron in a bath containing 2 to 4 per cent of the dye, 1 per cent acetic acid, 15 per cent salt and 6 per cent of 32 deg. Tw. chromium acetate liquor. Dye at not over 65 deg. Cent. (150 deg. Fahr.) for an hour, rinse and steam for one hour without pressure. This leaves the cotton rather stained, but it may be cleared by Method No. 34. The color may be brightened by topping it, after washing and clearing the cotton, with a mixture of Crystal Violet and Victoria Green in a neutral bath, which may be heated to aid exhaustion. Alizarine Orange RP and Alizarine Cyanine AK may also be applied to acetate silk.

Method No. 40: Anthracene Blue on Lustron.—Anthracene Blue can be dyed as an acid dye with acetic acid and salt as in Method No. 15, or it may be applied

(*Continued on page 345*)

The Reddening of Sulphite Pulp

Part II

(*Concluded from page 309*)

Sulphurous Acid Neutralized with Calcium Hydrate—Sulphurous Acid with Calcium Chloride—Sulphurous Acid Contained in Solution Determined During Treatment

By DR. E. OEMAN

(*Translated by Dr. Paul Bartholow*)

E.—Sulphurous Acid Neutralized with Calcium Hydrate

IN each sample the total SO_2 content was 0.016 per cent; to sample 1 no lime was added, to samples 2-5 increasing quantities of calcium hydrate were added in the form of clear lime water. The treatment was carried out at ordinary temperature as in the foregoing tests. The result appears from the following table:

Sample No. 1 (composition of solution, SO_2)—
- Appearance after ten minutes.....Weak red
- Appearance after twenty minutes.....Gray
- Appearance after thirty minutes.....White
- Appearance after one hour.....White

Sample No. 2 ($CaO + 3\,SO_2$)—
- Appearance after ten minutes.....Red
- Appearance after twenty minutes.....Distinctly red
- Appearance after thirty minutes.....Weak red
- Appearance after one hour.....Gray

Sample No. 3 ($CaO + 2\,SO_2$)—
- Appearance after ten minutes.....Red
- Appearance after twenty minutes.....Distinctly red
- Appearance after thirty minutes.....One-half red
- Appearance after one hour.....Weak red

Sample No. 4 ($CaO + 1.5\,SO_2$)—
- Appearance after ten minutes.....Red
- Appearance after twenty minutes.....Reddest
- Appearance after thirty minutes.....Three-quarters red
- Appearance after one hour.....One-quarter red

Sample No. 5 ($CaO + SO_2$)—
- Appearance after ten minutes.....Red
- Appearance after twenty minutes.....Reddest
- Appearance after thirty minutes.....Red
- Appearance after one hour.....One-half red

The result was conclusive, because a series of fine colors were obtained, namely, of such a kind that with increasing lime, the solution loses its power to remove the red color from sulphite pulp. For bisulphite, $CaO + 2SO_2$, the process of decolorization is about as slow as for pure SO_2 solution, naturally with the same total content of SO_2. This circumstance is of the greatest importance if we wish in practice to remove the red color from sulphite pulp by means of sulphurous acid, for we know in this way that the cooking acid acts with much less strength than pure sulphurous acid solution. This result is in accordance with that previously obtained in the respect that it is the undissociated H_2SO_3 which is effective in removing the color.

F.—Sulphurous Acid with Calcium Chloride

The content of total SO_2 was 0.016 per cent in each sample; to 2, 3 and 4 increasing quantities of calcium chloride were added Otherwise as above. Results were as follows:

Sample No. 1 (composition of solution, $0.0025 - n\ SO_2$)—
- Appearance after ten minutes.....Whitest
- Appearance after twenty minutes.....White
- Appearance after one hour.....White

Sample No. 2 ($0.0025 - n\ SO_2$ and $0.1 - n\ CaCl_2$)—
- Appearance after ten minutes.....Red
- Appearance after twenty minutes.....Distinctly red
- Appearance after one hour.....Grayish white

Sample No. 3 ($0.0025 - n\ SO_2$ and $0.2 - n\ CaCl_2$)—
- Appearance after ten minutes.....Red
- Appearance after twenty minutes.....Distinctly red
- Appearance after one hour.....Weak red

Sample No. 4 ($0.0025 - n\ SO_2$ and $0.7 - n\ CaCl_2$)—
- Appearance after ten minutes.....Reddest
- Appearance after tyenty minutes.....Reddest
- Appearance after one hour.....Weak red

The sulphurous acid was estimated as monobasic. After an hour sample 2 had about the same color shade as sample 4 had in experiment D after an hour, that is, 0.2 — n calcium chloride acted with the same power in delaying the disappearance of the color as 2 — n sodium chloride. This would naturally depend on the fact that calcium bisulphite by dissociation gives fewer HSO_3 ions than sodium bisulphite. This result is probably due especially to the fact that calcium bisulphite can be dissociated in a different manner from sodium bisulphite.

All the foregoing experiments clearly show that it is the undissociated sulphurous acid, H_2SO_3, which is the effectual agent in removing the red color by means of sulphurous acid. We have also seen that a certain degree of concentration of such undissociated sulphurous acid is necessary in order that the disappearance of the color can occur in a definite time. We shall now see how the total quantity of sulphurous acid diminishes and how simultaneously the reddening disappears. The following experiments were carried out in the same manner as No. 3 in experiment A, but with such large quantities that a sample could be taken without any appreciable diminution of the whole amount and tested as to its content of sulphurous acid.

G.—Sulphurous Acid Contained in Solution Determined During Time of Treatment

One hundred grams of air dry cellulose was weighed off and shaken up in water, expressed, weighed again, and stirred in 1 liter of water containing 0.008 per cent sulphurous acid. After a certain time 10 c.c. were withdrawn each time and the quantity of sulphurous acid contained in it determined by titration with n/500 iodine solution with starch as indicator.

Time (minutes)	SO_2 in Water (per cent)	—Milligrams of SO_2— Remaining	Consumed
..	0.0065	78.0	....
10	0.0038	45.5	32.5
25	0.0031	36.7	40.9
43	0.0027	31.5	45.7
62	0.0025	29.0	47.9

By estimating the quantities of SO_2 the loss in taking the sample was correspondingly corrected. From Chart 1, we see how the quantity of sulphurous acid varies with time and that the actual consumption ceases after

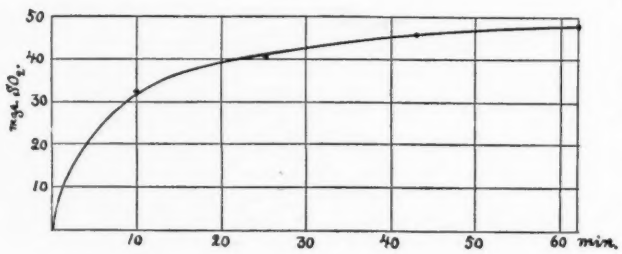

Fig. 1.

about 30 minutes. If we compare this with the result in experiment A, we find a very good agreement, for in sample 3 the greater part of the red color disappeared after this time. Similarly the remaining observations, namely, that three-fourths of the reddening remained after five minutes and the half after ten minutes, agrees fairly well with the consumption of sulphurous acid according to the curve in Chart 1.

Since we can remove the reddening in pulp by treating the cellulose with a weak aqueous solution of SO_2, it is of great interest to investigate whether pulp treated in this way during storage, after consequent moistening with water, will keep uncolored. In order to demonstrate this matter, sulphite pulp from three different mills was treated with weak SO_2 solution, from which sheets were prepared. These sheets were dried in the air and stored in a room under ordinary lighting conditions. After a certain time samples from such a sheet were taken and tested for subsequent reddening when moistened with water. It was shown in this way that one of the samples became clearly red again, another showed only a faint superficial reddening, while the third remained uncolored. These observations indicated that the oxidation process which produced the reddening substance pursued an unequal course. When, then, the reddening was obviated and the pulp stored again, the new formation of the red coloring matter could occur in various amounts in the samples. If the reddening of sulphite cellulose is to be prevented, this must be effected when the pulp has been stored so long that the color has reached its maximum intensity, for it is an accepted fact that after this period no reddening worth mentioning can occur. The treatment with sulphurous acid must be effected without the presence of salts in the form of an aqueous solution. The time of treatment may be reduced considerably by raising the temperature.—Svensk Papperstid., Nos. 21 and 22, Nov. 15 and 30, 1924.

STANDARD HOSIERY COLORS

The Textile Color Card Association of the United States, Inc., has just released the Standard Hosiery Color Card of America, containing sixty-six colors selected by the official Hosiery Committee appointed jointly by the Textile Color Card Association and the National Association of Hosiery and Underwear Manufacturers. They comprise a wide and comprehensive collection covering all the staple needs of the industry. They were adopted as standards, either because of their long usage or through their potential attribute to established popularity in view of the present style trend.

With the establishment of the color standards the old confusion in matching is eliminated. It acts as a color guide to hosiery manufacturer, jobber and retailer alike, and will facilitate ordering all along the line.

The movement toward the standardization of hosiery colors has met with the unqualified approval and co-operation from the hosiery manufacturers and jobbers throughout the country. Already the standard colors and standard names are filling the long-felt need for color stability.

BRITISH DYESTUFFS APPOINTS DR. ARMSTRONG MANAGING DIRECTOR

Dr. Edward Franklin Armstrong, president of the Society of Chemical Industry from 1922 until last year, has been appointed managing director of the British Dyestuffs Corporation to succeed Sir William Alexander, who resigned last November. Dr. Armstrong was formerly technical director in charge of the works of Joseph Crosfield & Sons at Warrington.

Following the resignation of Sir William Alexander, it will be recalled, the chairmanship of the British Dyestuffs board was held by Lord Ashfield, chairman of the London Underground Railways and former Government's representative on the British Dyestuffs Corporation's board. As Lord Ashfield succeeded to both positions held by Sir William—those of chairman and managing director—he will retain his position of chairman of the corporation.

Proceedings of the American Association of Textile Chemists and Colorists

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APRIL MEETING OF THE NEW YORK SECTION

The April meeting of the New York Section of the American Association of Textile Chemists and Colorists convened at 8.15 P. M., April 24th, at Stewart's Restaurant, 30 Park Place, Chairman E. F. L. Lotte presiding.

After the routine business of the Section was transacted, Chairman Lotte introduced Chas. E. Mullin who addressed the meeting on the subject of "Moths and Mothproofing." A motion picture was shown to illustrate his talk.

Moths and Mothproofing

By CHARLES E. MULLIN, M. Sc., F. A. I. C.

Down in Philadelphia we are hearing a lot about the Sesquicentennial, which they plan to make more or less of an exhibit of the many advances made in the lines of art, science and industry during the last 150 years. Now, as the whole insecticidal industry has practically been established within this 150th year period, and in this industry possibly no other branch has made so much progress as that of moth prevention, this industry should certainly occupy a prominent place in the Sesqui exhibits.

We are all somewhat familiar with the older periodical and more or less ineffective methods of combating the ravages of the moth. These were used in our homes since childhood, but possibly some of us are not as familiar with the more recent advances in this field. Advance in any field follows demand. I think you are all familiar with the many quotations in Biblical and other ancient literature concerning the moth and its ravages. It has been stated that about 1 per cent of the world's production of wool is destroyed annually by moths, and it was the enormous and heretofore uncontrollable ravages of this insect that resulted in the present methods of entirely and permanently preventing damage by moths.

Before going further into the matter I am going to ask Mr. Lawsberg, of the Interstate Chemical Company, who has kindly brought the film on moths, to show you this film, as it will illustrate what I am going to discuss later better than I can tell it to you. The film was made in the Bayer Biological Laboratories at Leverkusen.

. . . At this point a very interesting and educational film was presented, showing the various stages in the life of the moth, its manner of living and its destructive effects, as well as the methods of testing the effectiveness of mothproofing treatment. The picture showed interesting views of the work of the Bayer Biological Laboratories and many unusual "close-ups" of moth eggs and of moth larvae hatching from the eggs, attacking a piece of fabric and making around themselves fluffy cases partly composed of the fibers upon which they lived. The film featured the mothproofing test in which one-half of a sample of cloth was treated and the other half left untreated; when the cloth was exposed to moth ravage the untreated part was eaten to shreds, while only very slight damage to the edges of the treated portion resulted. . . .

I am not going to trouble you with the many minor details of the zoology of the moth, as I am not an entomologist, and furthermore I would hardly feel at home in discussing this subject to an audience including Dr. Back, who is with us to-night. In fact, I feel that I should say that I am really deeply indebted to Dr. Back

for much of the data I have been able to collect on moths, their control methods, etc.

However, I will briefly outline the life cycle of the moth for the benefit of those who have not been sufficiently interested in the subject to follow it in the literature. To those who wish additional information on the subject, I can refer you to the many books on zoology, Dr. Titschalk's book on the webbing, clothes moth, and Dr. Back's publications of the Department of Agriculture

There are three varieties of moths, by far the most common of which is the webbing naked or Southern clothes moth. Possibly the most curious and interesting variety is the case-making moth. We also have the tapestry moth, which is larger than the other two varieties, and fortunately even rarer. It prefers a diet of coarser materials than the other two varieties.

The life cycle of all three varieties of moths is the same, but I will describe the webbing moth. The moth proper, miller or butterfly, as it is often called, lays the eggs. In about four to eight days these egss hatch out, as was so clearly shown by the film. The larva as it leaves the egg is about 8 mm. or 1/30-inch long, white and blind. It requires about 100 days to reach maturity under optimum conditions, but may live for a year or so under less favorable conditions. It is in this stage that the moth or larva does all the damage. This is the only stage in which the moth eats during the life cycle and therefore it is the stage in which it is most influenced by external conditions.

On reaching maturity the larva of the webbing moth builds itself a case lined with silk and covered with fibers from the material upon which it is feeding, and its excreta. In this case the moth passes the pupal or chrysalis stage, and in about eight days in warm weather it emerges as an adult moth, miller or butterfly. The miller is able to fly in about thirty minutes after it leaves its case, and the female generally begins to lay eggs within twenty-four hours. Usually most of the eggs are laid at the first part of this stage, but the number deposited and the length of time during which it lays depends very largely upon the conditions during the larval stage of development.

The sole mission in life of the miller is the propagation of the species. They do not and positively cannot eat anything, and the female does not usually fly much, the male doing most of the traveling for the family. The millers usually die during the second week of this stage, but in cool weather may live longer. A female moth under optimum conditions may lay more than 200 eggs during the miller stage. They are inactive below about 13 deg. Cent. or 55 deg. Fahr.

In studying control methods for any variety of insects a complete knowledge of the zoology of that insect is of the utmost importance. Even a cursory study of the moth shows that the larval stage is not only the one in which all actual damage is done, but also in which it is most easily affected by external conditions.

I think I am correct in saying that the original work on the present method of mothproofing woolens, etc., was done by Dr. Meckbach and Dr. Titschalk for the Bayer Company. I also believe that all will agree with me that Dr. Titschalk's book upon the moth is the most complete and comprehensive treatise we have to-day upon the subject of moths. Unfortunately it is not available in English.

From what I have heard and read on the subject I believe that this mothproofing idea originated through the dislike of the moth for Martius or Naphthylamine Yellow which was at one time used somewhat as a constituent of many shades of green on woolens. I believe the original idea was to produce somewhat similar products either colored or colorless, etc., which the moth would not eat. However, as is often the case, the job was larger than expected, and I understand that the investigators worked for over eight years with some thousands of compounds before they brought out the original mothproofing compound—Eulan. In one summer alone it was necessary to collect 240,000 eggs to supplement their studies.

These investigations disclosed that a colorless mothproofing remedy could be produced. Had the inventor taken another direction and sought for mothproof dyes, it would have meant the discarding of all the wonderful color discoveries of the last decade which meet all the requirements of fastness and beauty, with the exception of the mothproof property. Even if such mothproof dyes could be invented in great variety and quality, this could be accomplished only with the heavier shades, and the difficulty would arise with the very fine delicate shades where only small quantities are used, and the larva would pay little heed on its onward path of destruction. Again, the mothproofing of white and undyed woolen materials would be another problem to be solved.

The requirements of a really successful mothproofing compound are many and exacting. It must be odorless, colorless, permanent, not injure the wool as to feel, handle, luster, strength, durability, spinning or weaving properties, or alter the shade of the dyed material. It should be easy to apply and it must not be too expensive.

As before stated, I believe we are all more or less familiar with the ancient intermittent and more or less unsuccessful methods of combating moths, but in order to recall them to your attention I will review them by name:

1. Constant watchfulness.
2. Thorough brushing, beating and sunning.
3. Careful wrapping in unbroken heavy paper or sealed boxes.
4. Naphthalene.
5. Para-dichlorobenzene.

6. Camphor.
7. Pyrethrum flowers in powder.
8. Cold storage.
9. Hydrocyanic acid gas.
10. Sulphur fumes or sulphur dioxide.
11. Carbon disulphide.
12. Carbon tetrachloride.
13. Cedar chests.
14. Dry heat.
15. Hot water or steam.
16. Soap solution.
17. Kerosene, gasoline, benzene or hydrocarbon oils.
18. Dry cleaning.
19. Mercuric chloride in alcoholic solution.
20. Cedar wood oil, chips or shavings.
21. Sodium fluoride or other fluorides.
22. Various phenols such as cresylic acid.
23. Cloves.
24. Oil of lavender; not the flower.
25. Creosote.
26. Arsenic powder.
27. Ferrous sulphate solution.

You are all no doubt familiar with the difficulties presented by each of these methods as well as the failure of most of them under any but the most favorable conditions.

I might add that mothproofing should be of interest to all manufacturers of woolen materials such as piano and other felts, plushes, rugs, carpets, tapestries and other household fabrics, such as hangings, winter blankets, men's dress suits and flannels, overcoat materials, etc., but, of course, not so much for women's garments, as they like an excuse to purchase new ones pretty often

It is only a matter of time until the public will be educated along this line, and they will then demand mothproofed goods. It has already been recommended by many trade associations.

I might add that the Bradford Dyers' Association, Ltd., of Bradford, England, one of the largest dyeing and finishing concerns in the world, has accepted Eulan for all fabrics subject to moth damage, and are to-day treating such fabrics without additional charge. They consider Eulan mothproofing a most interesting advertisement.

If any person is interested in a further discussion of these methods I will be glad to answer any questions as far as I am able, or more detailed information may be available in the March and April issues of Mr. Nieman's journal, The Textile Colorist.

Discussion

Dr. E. S. Chapin—What per cent of Eulan is it necessary to use in order to mothproof a piece of cloth?

Mr. Mullin—They recommend about a one per cent solution—that is, prepare a one per cent solution, and use the clear liquor. When you impregnate the fabric with this solution there is no material taken from the bath; that is, the bath remaining is just as good as that used at the beginning. You simply add more clear solution. The main point is to get the material thoroughly impregnated with the Eulan solution. Fibers that are not impregnated with this solution are not mothproofed.

Giles Low—Is there no actual affinity?

Mr. Mullin—There is possibly a certain affinity, but not in solution. By the way, Eulan is not a poison. The moths simply will not eat it. They starve to death rather than eat it. The peculiar thing is that the moths are able to eat some of the things that they do. For instance, chrome-dyed fabrics. Chrome is pretty poisonous, not only to individuals but to some insects. Copper isn't highly desirable as a constituent of a diet. Take some of the dyes, they have a pathological action, used in medicine to a large extent, but some authorities even claim that the moth will thrive to the same extent on dyed as undyed wool. But that is doubtful. Very few dyes are acted on to any great extent in the digestive tract of the moth. The digestive process is no doubt an alkaline one, in that wool dyed red with litmus will become blue in the digestive tract, but possibly due to uric acid it turns red in the excreta. The excreta from moths generally is the same color as the dyed material on which they feed. Some few of the dyes are acted on to a certain extent, but not what you would think, and they don't seem to have the physiological action on the moth that you would expect them to have.

Many people ask about the constitution of this and other mothproofing compounds. I don't know—I spoke to a man to-day who is a much better authority on this subject than I am, and he said he didn't believe anybody could state the effectiveness from the constitution of a product. I have never analyzed this product because even though I knew its constitution, I wouldn't know any more than I do to-day. When a moth will thrive on dyed wool and chrome compounds, it is hard to tell what he is not going to like.

Mr. Low—If this is not an affinity but an impregnation, is there any tendency for it to wash out?

Mr. Mullin—Very few woolens are washed to-day; they are usually dry cleaned.

Mr. Low—Blankets, for instance, are washed once a year in most homes.

Mr. Mullin—I haven't gone into that particular end of it, but even if no mothproofing compound would stand any washing, it would still have a wonderful field in that upholstery, tapestries and the very finest materials are not washed. What I understand from work that has been done on this, is that it will stand limited washing.

Mr. Low—Rugs, for instance, that are "shampooed" with water and soap.

Mr. Mullin—In that case you don't even give it such

a thorough rinsing. I wouldn't think that that would do it.

Mr. Low—If a product is soluble in water to start with?

Mr. Mullin—Not highly. You wouldn't call a one per cent solution a highly soluble product. I tell you truthfully, I haven't gone into that end of it to a great extent, because the problem that came to me in the consulting business was to know whether this material was effective.

Mr. Low—In the film the expression "permanent" was used, and I wondered whether it was an exception in the case of repeated washing.

Mr. Mullin—Dyes are considered permanent, and yet you can fade them. Permanency is really a matter of comparison. Nothing, you may say, is really permanent.

Mr. Bardka—Has the word "Eulan" a meaning?

Mr. Mullin—None that I know of. I am not connected with the Eulan Company, or any company handling it, so I can't state that.

Chairman Lotte—Are there any other questions that you would like to ask Mr. Mullin?

Mr. Low—How long is the impregnation process?

Mr. Mullin—Merely enough to thoroughly saturate the fabric.

Mr. Low—That is, to get the goods thoroughly wet. If the goods go in the process dry or wet, does that make any difference in the length of time?

Mr. Mullin—It is like in dyeing or anything else; if it goes in wet, that would weaken the solution somewhat.

Mr. Low—Would there be any tendency in a wet piece of goods to retard the action?

Mr. Mullin—I think if I were applying the solution, I would prefer to apply it to dry material. With a piece of woolen cloth, you can leave 35 per cent of moisture in it without much trouble, but you would not have as much Eulan in the piece as you would have by putting it in dry.

Mr. Low—Is there any way of determining how much of the Eulan is on the piece of wool?

Mr. Mullin—A direct ashing will tell you something, especially if the material wasn't chromed. You could run a blank on your material, too.

W. H. Peacock—Is Eulan affected by dry cleaning?

Mr. Mullin—It is not. I understand they are working on an Eulan to be applied in a dry cleaning method, that is soluble in benzine or something of that kind, but the present product is not removed by dry cleaning, in my experience.

Chairman Lotte—Does it make any difference whether the goods are alkali or acid, or should they be neutral?

Mr. Mullin—Of course, it is natural that all woolen materials should be nearly neutral. Eulan or any of these compounds are generally applied in the last finishing operation, and it is very unusual to leave the wool in a highly alkaline condition in finishing. I don't think a slight trace of acid would have any detrimental effect, but I would think it would be desirable to have the goods in a neutral condition.

Chairman Lotte—I was wondering whether it affected the Eulan at all.

Mr. Mullin—I don't think it would be affected, although I haven't gone into that end of it. The problem that came to me was simply its effectiveness; that is what I was paid for doing, and that is what I did. The various details, and so forth, I didn't go into, but I can't see from what I know of it, that slight acidity or alkalinity would affect it in any way.

Chairman Lotte—Are there any other questions?

Mr. Sokolinski—Is para-dichlorobenzene any more powerful than ordinary naphthalene?

Mr. Mullin—Possibly not quite as effective. It is more expensive. To certain people it doesn't have quite as objectionable an odor, but it is possibly not quite as effective. A lot of those things under ideal conditions are effective, but they all have their objections. Naphthalene and para-dichlorobenzene are effective against certain stages, especially naphthalene. They claim that naphthalene is not effective against the mature larvae. I have heard it said that larvae will crawl around naphthalene flakes without any detriment. If you use enough naphthalene in an enclosed space, you will have very little trouble with moths, but if you use it on an evening suit during the summer you'll smell like a moth-ball.

A lot of furriers are supposed to put the furs in cold storage. They simply put them in a room with a lot of naphthalene, and they won't deliver them to you for twenty-four or forty-eight hours after you order them, simply so that they can air them and remove the odor.

By the way, Eulan should be used in the finishing of tanned material before furs are made up. Possibly the benzene soluble Eulan would be more applicable to the finished material.

The present material can be applied to carpets in use; that is, the carpet can be put on a concrete floor or a tight floor such as this, and simply saturated with the solution and dried. It would be pretty hard to apply it to furniture or anything of that kind.

Mr. Low—Why can't Eulan be applied to a finished fur?

Mr. Mullin—Did you ever try to wet fur and bring it back into shape?

Mr. Low—Is it simply that you can't wet the whole fur?

Mr. Mullin—I would hesitate very much to put a fur coat through any such operation.

Mr. Low—It isn't that it affects the actual fur in any way?

Mr. Mullin—I don't think it would have any detrimental effect on the fur at all, but I have worked very little with furs.

Mr. Low—Furs get caught in the rain quite often and brush out of that.

Mr. Mullin—The moth will eat not only the fur, but it will very often go into the body of the hide, you know. To be effective, you have to get the whole thing impregnated. As I understand, and I certainly believe I am right, in the finishing of all furs one of the last operations is the softening and bringing them into a state where they are not brittle. I don't know a great deal about furs, but I do know from what experience I have had with them, that once you get them thoroughly wet, sometimes they dry so hard they almost break when bent.

Mr. Low—Are there any dyes or classes of dye that are affected by Eulan?

Mr. Mullin—I have never heard of any. That is one of its points.

Mr. Low—Could it be applied in the dye bath?

Mr. Mullin—It could be but it possibly is not recommended in that you generally discard your dye bath.

Mr. Low—For instance, a great many knitting yarn dyes are not given any further process after they are dyed—not even a wash.

Mr. Mullin—I understand it can be applied in the dyeing operation, but it is much preferable to use it in a separate operation.

Mr. Stott—Is this meant for the wholesale or the retail trade?

Mr. Mullin—As I understand it, it is not offered to the retail trade at all at present.

Mr. Stott—You said it was inorganic. As such, it will be without odor.

Mr. Mullin—I don't detect an odor in it. It is comparatively odorless.

Chairman Lotte—I am sure we are indebted to Mr. Mullin. I am sure we all enjoyed his talk as well as the film, and I am sure that the discussion that we had was interesting. I shall be glad to entertain a motion that a vote of thanks be extended to Mr. Mullin for presenting this to us in such an able way.

Mr. Low—I make such a motion.

. . . The motion was seconded and carried unanimously. . . .

Chairman Lotte—I am sure, Mr. Mullin, we are glad to have had you here, and I am sure we enjoyed it. (Applause.)

Our next speaker to-night does not need any introduction. Dr. Edward S. Chapin is going to speak to us on "The Depreciation of the German Currency and the Dawes Plan." Dr. Chapin was asked to go to Europe for three months and stayed there four years. They didn't let him come back. It seemed like a long while that he was there. I must say it was the Americans that didn't allow him to come back.

The Depreciation of the German Currency and the Dawes Plan

By Dr. Edward S. Chapin

Mr. Chairman and Gentlemen—I am glad to speak to the New York Section on the depreciation of the German currency and the Dawes plan because I believe that with the solution of the problems connected with this subject is tied up very closely the future peace and prosperity of the world.

At the outset I wish to state that I do not pretend to speak as a financial expert but will merely draw from those experiences and observations which came to me in the course of my work in Europe.

I hold in my hand a trillion—not of dollars, I wish it were—but a trillion of marks. A trillion of marks before the war was worth more than the total wealth of the United States; to-day this depreciated German currency of the year 1923 is worth less than a quarter, 23.8 cents. This measures the tremendous depreciation of the German currency which took place in the year 1923. It is unthinkable!

Here is a note for fifty billion marks. Worth one cent. You might think you had a lot of money with this note for 10,000,000,000 marks, but it is really worth only one-fifth of a cent!

Some years ago when the mark was worth 1½ cents one of my associates before returning home invested in 5,000 marks, paying $75. To-day his $75 of marks is worth just one-eighth millionth of a cent.

Another friend bought 100,000 marks when the mark was worth 3½ cents, paying $3,250. Recently I was lunching with him and he asked me what his 100,000 marks were now worth. After some figuring I replied: "Your $3,250 of marks are now worth one-fortieth thousand of a cent. Some investment!" "Yes," he replied, "I think I will have them framed as a souvenir."

Those who are nearest to me have doubtless observed that the currency I have exhibited is not Reichsbank notes, but the currency of cities. The trillion mark note was issued by the city of Frankfort; the fifty and ten billion mark notes by the city of Cologne. Here is a five hundred billion note issued by the railroads. Here is a two trillion Reichsbank note, worth about 50 cents.

The reason for this odd jumble of currency was as follows: Financial experts state that Germany needs a currency circulation of 6,000,000,000 gold marks. This is not a very large amount for a population of 60,000,000; about $25 per capita. This amount is necessary to provide for the needs of business. In April, 1924, the outstanding notes of the Reichsbank amounted to about 738,000,000,000,000,000,000 (738 quintillions). It was said that the national march of Germany was no longer the goose step but the goose egg. (Laughter.) These 738 quintillions of paper marks, however, only had a gold

value of 738 millions, about one-eighth of the currency requirements. Floods of money but only one-eighth as much as was necessary to keep business a-going. Hence the Government authorized the cities, counties, and even private concerns to print their own money to help out to give people a medium of exchange.

Here is a million mark note printed by the Bayer Company. When I was at Leverkusen in September, 1923, this note was worth 25 cents. Two weeks later when I left Germany it was worth 1¼ cents. This measures the rapid depreciation of the currency. How would you feel if your quarters shrank in two weeks to 1¼ cents?

Here is a 5 million mark note of Hoechst. Then I have here a series of different kinds of Noth Geld (emergency money). Here is a 5 gold mark note printed by Hoechst. Here is a note for one dollar; another for one-half a dollar; and another for ein Zehntel (one-tenth) of a dollar. These last were based on gold dollar deposits in New York; and on the back of these notes you will observe the names of Griesheim and Kalle.

These various forms of emergency currency were actually at times during the depreciation of the German currency the only way industrial concerns had of paying their help.

(At this point in his address Dr. Chapin told a number of humorous stories illustrative of situations arising from the great and rapid depreciation of the mark.)

Of course, those stories are humorous, but there was the serious side of it which evenually came. For instance, during the periods when the mark would be depreciating you would see in some of the German towns a line of workmen or people, wives, a hundred or two hundred in a line, waiting outside of a bank, endeavoring to draw out their currency against its rapidly shrinking value. You can imagine the feeling of a person who would have a reasonable deposit in a bank, when he saw a clerk come out every ten minutes and hang out a sign that the currency had gone down fifty, or seventy-five, or one hundred per cent while he was waiting. You can imagine their feelings when they saw their savings shrinking away at that rapid rate.

So for the shrinkage of the return on securities. One of the men at the Badische plant (at the last visit I paid there) told me that the securities which he had, netted him only eight per cent of what they did before the war.

So with the big corporations. I think perhaps the most striking illustration of this that I had came through a friend in Paris who was European manager of an American concern which had factories in five or six countries in Europe, France, England, Italy, Austria, and two factories in Germany. In order to help me out, he let me look over their different balance sheets regularly, and I followed with great interest the operation of the German factories, especially in 1923. These two factories in Germany were supposed to earn $10,000 a month. Remember, that according to the German law, the currency was kept by the firms in Germany in paper marks. That was the legal tender—this depreciating Reichsbank note was legal tender. Well, in January, 1923, this firm earned its $10,000. That was when the French went into the Ruhr; the valuation was then 5,000 to a dollar. In two weeks it was 50,000 per dollar. Then the German Government stabilized it for a couple of months at about 22,000 to a dollar, and after April 1st the toboggan commenced, and it finally got down in November to thirty-six trillion to a dollar.

Now let us follow the profits of these two German factories. In January they made their $10,000. In February and March, the currency was stabilized so they made the $10,000, and, in fact, because of the appreciation of the currency from 50,000 to 20,000 to the dollar, they actually in March made more, so that at the end of March they had $35,000 in paper marks. And in April the toboggan commenced and at the end of April, instead of having $40,000, they had paper marks translated into dollars, $25,000. At the end of May, instead of $50,000, they had $15,000. At the end of June, instead of $60,000, they had $10,000. At the end of July, instead of $70,000, they had $8,000. At the end of September, they had $2,000, and when I was looking at it in October, I said, "What is it going to be in October?" He said, "Nothing, I guess." They felt the depreciation the same as my friend who had his $75 that I told you about, in marks, and the other fellow who had $3,000—it went down to nothing practically.

I said to him, "I should think you would say, 'Here goes nothing,'" and he said, "That is just about what we do say; we have forgotten our German factories."

Of course, there was the other side of it. Those who knew how to take advantage of the market could make a lot of money. One of the captains of industry in Germany complained that Hugo Stinnes borrowed all the money in Germany and the rest couldn't get a chance. That may or may not be so, but then he was a pretty reliable man who made that statement. You can readily see that where this money would depreciate a big man could make a loan at a bank, change it into foreign currency, hold it for a couple of weeks, and then pay back his loan with a very small fraction of the loan, as he paid it back in marks.

Then, too, there was the attempt, money being valueless, to change money into things. The people bought clothing and furniture. The factories built other factory buildings, mines, railroads, and so forth and so on, and so Germany was very, very busy during the depreciation in order to translate the money into things.

It was possible during that period to talk to almost any point. That is to say, you could prove that there was poverty in Germany, or you could prove that there was wealth. Either argument could be defended, but the

fact remains that by the fall of 1923, Germany had passed through a series of financial crises, through an economic crisis, and was practically on the road to ruin.

The question comes, how did this all come about? How could a nation, distinguished before the war for pre-eminence in financial matters (German financiers were all over the world; in economics and business the German industrialist was almost a synonym for progress and ability) get into a situation like this? The answer is that the situation came about through a bad financial policy. I am not going to attempt to enter into any of the discussions which have centered about the reparation situation, the many arguments pro and con, but will simply confine myself to stating that two committees, one invoked by the German Government itself, studied the situation. They were composed of the leading financial men of Europe—neutral, German, and otherwise—and they all reached the same conclusion.

During the war, as you know, there were many loans floated in Germany, the same as there were here. In fact, the German war loans came up to $25,000,000,000, and Germany was virtually fighting the world, financing her allies as well as herself, and she had a need for an awful lot of money. When the loans and other means gave out, they started to inflate, to print money. It was hoped and expected that after the war was over they would make this up by an indemnity from the nations that they had conquered, but they didn't do that.

I perhaps don't need to tell this audience that a bank note is only good if it can be redeemed. If we have a Bank of England pound note and can step into the Bank of England at any moment and get it redeemed as a gold pound, it is worth its face value. If we can't, it is only worth that proportion of the amount of money we get back.

If we have a dollar and can get a dollar in return, our money is at par; but if our Government prints so many dollars that we can only get a quarter for the paper money we have, the paper money will be only worth a quarter. I don't need to enlarge upon that. And so it came about that at the end of the war, Germany had so much more money out than she could redeem, that the mark was around eight cents, I believe. After the war, the receipts in Germany were less than the expenditures, and the deficit was made up by printing money, so that by 1919—August, 1919—when the celebrated dyestuff inventory was taken, the mark was down to five cents. Six months later, in February of 1920, it was down to one cent. Then it strengthened and gradually rose to about three and a quarter cents in the summer of 1920. I remember talking with Dr. Dinsberg about that time at Leverkusen and asking him if he thought the mark would continue to strengthen. He was very optimistic and said it would; but it didn't. From that point it steadily went down.

The German Republic has been weak. It has been unable, for various reasons, to make its receipts equal its expenditures, and the deficit has been made up by printing money, and the more money that was printed, the more it went down.

The great complication in the whole thing, of course, has been the relationship with the allies. We come to the Peace Conference when the question of reparation was taken up. There were several ideas there. The French idea was that Germany, having caused the war, should be made to pay the entire costs and damage of the war. The American idea was that Germany could pay about fifteen to twenty billion dollars. The English also had an idea. It was finally agreed that no one could tell just what Germany could pay, but that a commission should be set up, called the Reparation Commission, which would study the capacity of Germany to pay, and inside of two years would announce how much that should be. So the treaty was drawn up providing that the Reparation Commission should determine how much Germany should pay fix a schedule of payments, and then came the clause which has to a certain extent made the most trouble of all—Article 234—that at different intervals the Reparation Commission would have the right to examine into the capacity of Germany to pay and to modify and revise matters.

The German contention from the first was that it was unfair not to fix the sum in advance; that if they paid once and were quit, that would be a fair deal. Second, they said that the demands were too great, and third, that this power to revise the findings was equally unfair. The allies replied that it was impossible to tell what Germany could pay, that as Germany was responsible for all the losses and damages of the war, she ought to pay all she could. So for years there was the fight back and forth to get as much from Germany as possible, and on the part of Germany to get out of paying any more than she possibly could avoid.

I think perhaps a typical illustration is the Spa Conference in 1920. Germany agreed, according to the treaty, to furnish in the first two years before the Reparation Commission had fixed the grand total to twenty billion marks, in order that the allies could proceed to the restoration of their economic life, that meaning especially France and Belgium. In the Spa Conference in 1920, the Germans came ahead and said that they had already paid that amount and submitted a long list of various deliveries which they had made, among them being ships and abandoned material, which they evaluated at ten billion marks. The Reparation Commission came back and said it was only worth one billion marks. So you can see there was quite a difference between what the Germans had in

mind and what the Reparation Commission had in mind.

Eventually, in May, 1921, the Reparation Commission fixed the total at one hundred and thirty-two billion gold marks—about thirty-three billion dollars. Immediately Germany protested this to be beyond her capacity.

In the meanwhile, the German currency was steadily depreciating. The Germans claimed that this was due to reparation payments and repeatedly asked for a moratorium on such payments. The allies claimed that the Germans deliberately depreciated the currency in order to appear as poor as possible, to seem to be unable to make reparation payments. The French, before receiving almost anything appreciable from Germany on reparation account, proceeded to restore their economic life and rebuilt largely in the devastated region. They spent practically sixty-five billion francs, and also disbursed in pensions thirty-five billion more. So that on one hand there was the decreasing ability of Germany to pay, and on the other hand the increasing need of France and Belgium for money. England and France early parted company; England contending that the amount that had been assessed, one hundred and thirty-two billion gold marks, was too much, and France sticking for the whole. The present Foreign Minister, Briand, was Prime Minister at that time, and there was a party in France headed by Millerand and Poincare that thought that Briand was not defending the rights of France. That is why in January, 1922, Briand was obliged to resign and Poincare and his party came in with the avowed intention of making Germany pay. The split between the English and the French grew steadily wider, and finally they parted company, and the French went into the Ruhr, as Poincare said, to make Germany pay the reparations which they could pay. This was really the final blow that caused the Germany currency to depreciate to the vanishing point.

The situation developed differently from what was expected. The French started to make a customs line in the Ruhr, and then they ran up against passive resistance in Germany. The German Government, under Cuno, ordered the industrialists in the Ruhr not to pay any customs duties to the French. The French replied by decreeing that if customs duties were not paid, goods could not be exported, and you will remember that in the first part of 1923 for a while, in fact, all through the summer of 1923, no dyes came out of the occupied area, because of this disagreement between the French and the Germans.

The natural result of non-exportation was the closing of factories eventually, and idleness on the part of the workmen. The German Government said to the industrialists in this region, "If you will not export goods, if you will not seek a license from the French, we will pay the wages of your idle workmen"; and so it came about in the course of several months, that there were hundreds of thousands and running up into the millions of workmen idle in the Ruhr and adjacent Rhineland occupied region, whose wages were being paid by the Government. Thus, you see, two things happened. In the first place, the German Government lost the revenue from its most busy and most profitable industrial region, and at the same time its expenditures increased enormously by paying the wages of these idle workmen. Consequently, the deficit was tremendous. This deficit was made up by printing money. The receipts were almost negligible compared with the expenditures, and the mark simply went on the toboggan. So that in the fall of 1923, when President Ebert proclaimed the cessation of passive resistance, he stated that that week it took one quintillion, four hundred thousand quadrillions of marks to pay for the idle workmen, and the next week it would take twice as many, and that the German Government could no longer continue it.

At that time the mark was sinking fast and reached in November the low point of thirty-six billion to a dollar. A friend of mine who represents the Wall Street Journal went into Essen at that time to get some marks. The bank was closed (it always was closed on days of panic when the mark was sinking), but he went in the back door and asked for some marks, and they said, "Help yourself." The marks were out in baskets on the floor, and he stepped over and took a basketful and didn't pay anything for it. The marks were practically valueless, and when he got back to his office his secretary counted the basketful and he had one hundred and seventy-one different bank notes, and there was about five dollars' worth of value in the whole thing.

Under those circumstances, of course, the German Government had to do something. As I stated earlier, when the mark was four trillion to a dollar, there was only one-eighth as much currency as was necessary to do business. When it was down thirty-six trillion to the dollar, you see there was practically only one per cent of the money in Germany that was necessary to do business. Germany was practically like an automobile, with every equipment, but with no gasoline or oil to run it.

Under those circumstances, the Government established the Rentenbank. I have here some samples of the Rentenmarks. This bank was a private bank. The currency was secured by a four per cent mortgage on industry and some on agriculture and some personal property, and went out at the same value practically as a gold mark. They immediately, or in the

course of a short period of time, lent seven hundred million of these to industry, and about a billion and seven hundred thousand to the Government. Then they did another thing which also helped the situation—they established the value that a trillion paper marks should be equal to one gold mark. In other words, they stabilized the currency at nine times its actual value, and prices went up overnight, roughly speaking, ninefold. That was the time when Germany changed from being the cheapest country in the world to practically the dearest country in the world. I remember the fare which I paid to travel a short distance which I traveled in the July preceding for twenty cents: the fare for the same distance after this stabilization was one dollar and a half. You read then in the paper of Germans going to Italy and France and elsewhere to buy. It was actually cheaper to pay the railroad fare to Paris and back to Germany and buy things in Paris, or to go down into Italy and buy things there, than to buy them in Germany.

Nevertheless, for the time being the situation was stabilized to this extent, that the value of the money was stable, and there was some money. But everybody knew (that is to say the leading men) that this was only a temporary affair, that the Rentenmark which was not legal currency could not be used in international exchange: that it was only a stop-gap: that unless something definite in the way of cleansing of the finances was put through, the old situation would recur, and Germany would be completely ruined.

Then came, after much negotiating, the Dawes Committee and the Dawes Plan. I will try to run over that briefly to give an idea of the essential features of the plan. You might ask, just why should the Dawes Committee have anything to do with reparations? The Dawes Committee was appointed with the object "to consider the means of balancing the budget and the measures to stabilize the currency of Germany." Now, as a matter of fact, as I have shown, the treaty obligations were a very important factor in the situation, and so this gave the necessity for the committee to go into the whole matter of just how much Germany could afford to pay annually in reparations, and at the same time keep the budget balanced and the currency stable.

Naturally, the trouble coming from a bank, the first thing that General Dawes and his associates, who were practically all bankers, did was to start out with a bank, a gold bank. They provided that there should be a new bank which should have a charter for fifty years and have the exclusive right to issue money in Germany. All this money that I have shown you would be retired, gradually, and this bank would have a reserve of one-third and other liquid assets, so that it was practically on a gold basis.

It was figured that the currency being stable and plenty of money being available to industry, a start toward prosperity could be made. They scrutinized very carefully how Germany could pay reparations, considering its condition, and they found three ways out of which they figured Germany could make payments: In the first place, from their ordinary budget when it was stabilized; that is to say, from taxation and other ordinary receipts. The second way was through the railroads. They found the railroads in Germany in most excellent condition, and they figured that the railroads could be made to pay a certain annuity every year. Then they figured that German industry itself could pay a certain annual amount in the way of annuities.

With regard to contributions from the budget, I will read from their report. They advanced the principle of commensurate taxation.

"It is not open to dispute as a simple principal of justice and it is contemplated in the treaty that the German people should be placed under a burden of taxation at least as heavy as that borne by the peoples of allied countries."

Thus the extinction of the German debt virtually relieved Germany of payments amounting to four and a half to five billion marks a year. As I remarked before, the German war loans amounted to ninety-eight billion marks, and as you have probably read in the paper recently, the German Government is proposing to pay back five per cent of the loans.

In regard to the railroad contributions, they figured that the railroads were worth about twenty-six billion dollars, and that they could issue bonds to the amount of eleven billions which would be executed in favor of and handed over to a trustee appointed by the Reparation Commission. These bonds would bear interest in an increasing amount, until the time when Germany would get on its feet; the first year three per cent, the second year four per cent, the third year five per cent, and the fourth year five per cent plus one per cent sinking fund. So we can begin to figure out the annuities that they estimated could be paid. This is shown by the tabulation on the following page.

In the first place, it was figured that practically the first year Germany of herself could pay very little, and the first annuity is principally made up from the loan which was floated of eight hundred million gold marks. The balance of the annuity was made up from a part of the interest on the railroad bonds, making the first annuity of one billion gold marks for the first year.

The second year, they figured that the budget could stand two hundred and fifty million gold marks, but that would come from either one of two ways. In the first place, the railroads, in addition to eleven billions of bonds would issue two billion of preference shares, one quarter of which would go to the German Government, and the other three-quarters to the company. So they figured that the second year the German Government would contribute two hundred and fifty million gold marks out of

the five hundred million gold marks which they would secure by the sale of these preference bonds of the railroads, or if they didn't sell, they would float an internal loan.

Then there was one hundred and thirty million marks left of the first year's interest on the railroad bonds, and four hundred and sixty-five million marks, four per cent on the second year of the railroad bonds. In addition to the interest on the railroad bonds, they figured that the German railroads could pay, and pay well, and they decided that a transportation tax should go to reparation. This would be seven per cent on the gross receipts from the freight not including coal, and ten to sixteen per cent on gross receipts from passenger traffic. They estimated that the second year this would amount to 250,000 gold marks, and in the subsequent years 290,000 gold marks.

Then the third source of revenue which they figured was well within the realm of possibility was from a mortgage on industry. They proposed a five billion industrial debenture mortgage, which they considered reasonable in view of the fact that the pre-war indebtedness of the German industrial undertakings was about that amount, and most of this indebtedness had been discharged at nominal figures by the depreciation of the currency. Furthermore, in the year 1923 one of the German leaders had proposed as one form of reparation a ten-billion mortgage on German industry and agriculture. The amount of the interest was again graduated to allow German industry gradually to get on its feet. The first year there was no interest to be demanded from these debentures. The second year it was to be two and a half per cent; the third year five per cent, and the fourth year and subsequent years six per cent. And so you see the second year the contribution from the industrial debentures is reckoned at 125,000,000 gold marks; the third year at 250,000,000 gold marks, and the fourth year it reaches the maximum of 300,000,000 gold marks.

By consulting the table we thus see that in the course of five years they gradually were able to figure reparation annuities running from one billion to two and a half billion gold marks.

Furthermore, they provided that after five years, if

THE DAWES' PLAN FOR THE PAYMENT OF REPARATIONS

Years	Budget	Interest from Railroads	Loan	Transport Tax	Industrial Debentures Interest	Total
1924-25	Balanced (If free from peace treaty charges.)	330,000,000 gold marks (200,000,000 gold marks of this sum is to be used for treaty payments, the remainder to be held until the following year.)	800,000,000 Gold Marks			1,000,000,000 gold marks
1925-26	250,000,000 gold marks (Obtained from the sale of preference shs of Railroads or, if this fails, from an internal loan.)	465,000,000 gold marks. And in addition the sum held over from the previous year, viz.: 130,000,000 gold marks.		250,000,000 gold marks	125,000,000 gold marks	1,220,000,000 gold marks
1926-27	110,000,000 gold marks	550,000,000 gold marks		290,000,000 gold marks (The transport should increase materially within a few years this sum shall go for reparations and the balance to the German Government.	250,000,000 gold marks	1,200,000,000 gold marks (see Note 1)
1927-28	500,000,000 gold marks (Subject to addition or reduction in certain contingencies i.e., controlled revenues.)	660,000,000 gold marks		290,000,000 gold marks (Any excess received from this tax, over this sum, shall go to the German Government.)	300,000,000 gold marks	1,750,000,000 gold marks (see Note 1)
1928-29 Standard (See Note 2)	1,250,000,000 gold marks (Subject to addition or reduction in certain contingencies	660,000,000 gold marks		290,000,000 gold marks (Any excess received from this tax, over this sum, shall go to the German Government.)	300,000,000 gold marks	2,500,000,000 gold marks (see Note 2)

Note 1.—If controlled revenues for 1926-27 exceed 1,000,000,000 marks (or for 1927-28 exceed 1,250,000,000 marks), one-third of the excess, but not exceeding 250,000,000 marks, is to be added to the payment from the budget for that year. On the other hand, if controlled revenues for 1926-27 are less than 1,000,000,000 marks (or for 1927-28 are less than 1,250,000,000 marks), then one-third of the deficiency, but not exceeding 250,000,000 marks, is to be subtracted from payment from the budget for that year.

Note 2.—1929-34 inclusive. Yearly payments of 2,500,000,000 marks from same sources as in 1928-29, plus such a percentage of 1,250,000,000 marks as the "index of prosperity" indicates is possible of payment. 1934-35 and subsequent years. Yearly payments of 2,500,000,000 marks from the same sources as in 1928-29, plus such a percentage of 2,500,000,000 marks as the "index of prosperity" indicates is possible of payment.

Germany increased in prosperity, there would be an amount added to these two and a half billion gold marks depending on what they called an index of prosperity. This index of prosperity took into account a number of factors: the total of exports and imports, the total of coal budget receipts and expenditures, railroad traffic, exclusive of coal measured by weight, total money value of consumption of sugar, tobacco, beer, alcohol, total population of Germany, and the consumption of coal. All these factors were worked up into a composite index, or are to be, and as they increase, as Germany prospers, a percentage is to be added to the two and a half billion gold marks. For the five years after 1928-29, this increase is to be figured on half of the standard annuity, i. e., half of two and one-half billion gold marks, and then from thereon it is to be figured on the entire total.

This leaves only one other principal factor of the Dawes Plan to be explained: what is called the controlled revenues. In order to guarantee the budget contributions, an Agent of Reparation Payment has been set up, and through his office the revenues from various sources go, that is to say, the taxes on customs, alcohol, tobacco, beer and sugar. The Germans estimated that in 1928 to 1929 this would amount to 1,700,000,000 gold marks. The allies estimated that it would be 2,146,000,000, thus more than the standard budget contribution provided by the plan.

Once those charges are paid, the plan provides that the Germans can have the balance, but they cannot touch any of their income from those sources until the annuity has been paid.

In August of 1924, as you know, the representatives of the Germans and the Allies met at London, and this is the paper that they drew up which gives a procedure for putting into operation the Dawes Plan. As you know, that plan has gone into operation, and I understand that the revenues are exceeding expectations, and perhaps I may close with what General Dawes said, that the plan if generally accepted will lead to a lasting and a permanent peace. (Applause.)

Chairman Lotte—I am sure we all enjoyed hearing Dr. Chapin, and, as usual, he will be glad to answer any questions that you would like to ask. Probably there are some here that would like to know additional facts. I am sure I learned quite a little to-night. Of course, we have all had experience with the vanishing value of money, but we can be happy in the thought that we were far better off than the other fellow at least.

Mr. Peacock—I would like to ask, have they issued any new currency under this Dawes Plan?

Dr. Chapin—Yes, I went down to the bank and bought a new Dawes banknote to-day. I didn't get a trillion marks for a cent. I bought ten marks, and paid $2.45 for them. As a matter of fact, I saw by the papers that they now have out about four billion marks, so that you see, so far as money is concerned, they now have money. Also I don't need to tell the gentlemen here that there has been some very free borrowing in America during the past winter.

Chairman Lotte—Do they still use this money at all in Germany?

Dr. Chapin—I don't know. What I mean to say is that the plan provides that it should be retired. Perhaps Mr. Metz can answer that question.

Mr. Metz—They have retired what hasn't been used to paper rooms.

Dr Chapin—When I bought this paper mark note and paid $2.45 for it, the man said, "Would you like one of the pre-war gold marks?"

I said, "Yes."

He said, "I will give you one. Here is a hundred marks on the pre-war basis. Before the war that would have been worth $23.80." Then he sold me—this thing is intricate; I don't pretend to grasp it—a thousand pre-war gold marks note for seven cents. He said, "There is a thought that perhaps the Government may put a little value on the pre-war gold notes, and so the speculators are picking them up. They pay sixty dollars a thousand and sell them for seventy dollars a thousand." So I have all kinds, from pre-war up to to-day here if you care to look at them.

Mr. Harold—I would like to know what part McKenna had as distinguished from Dawes and Young. I have understood that some people say that it should have been called the McKenna report instead of the Dawes report.

Dr. Chapin—There was another committee appointed of which McKenna was chairman that was supposed to look into the German exported capital, but the committee report was filed and has been practically left in the pigeonhole. This other report, the Dawes report to stabilize the currency, has occupied the center of the stage.

Chairman Lotte—Was that since the Dawes Plan or before?

Dr. Chapin—They worked simultaneously. I have a copy of the complete Dawes report if anybody would like to look at it after the meeting.

Mr. Metz—You didn't touch on the interest question. That is an interesting question, what they had to pay for money.

Dr. Chapin—I think, perhaps, you can answer that better than I could. I know it was very, very high, indeed.

Mr. Metz—It was twelve to twenty per cent a month

Dr. Chapin—And it was hard to get it at that.

. . . The meeting adjourned at ten o'clock, after giving Dr. Chapin a vote of thanks.

THIRTIETH COUNCIL MEETING

The thirtieth Council Meeting of the American Association of Textile Chemists and Colorists was held at the Chemists' Club, New York City, on April 11, 1925.

The following members were in attendance: L. A. Olney, W. C. Durfee, W. M. Scott, E. F. L. Lotte, R. F. Culver, A. E. Hirst, W. R. Moorhouse, J. F. Bannan and W. E. Hadley.

Letters of regret at being unable to attend this meeting were received from W. D. Livermore, W. H. Cady, W. S. Williams and G. A. Moran.

The names of the twenty-one applicants admitted to membership at this meeting will be published in the Proceedings in an early issue.

It was voted to send a copy of the 1924 Year Book to each dye manufacturer, a list of whose dyes have appeared in the Year Book, with the request that they check over the list and make any corrections or additions in their line of colors, in order that the 1925 Year Book may be brought more fully up to date.

It was voted that the coming Year Book should contain numbers used by the Color Index, wherever possible, as well as the Schultz numbers.

The Treasurer recently presented a list of 155 members who had not paid their 1924 dues, but further communications with these delinquents has reduced the list to 60 members. This list has been referred to the local secretaries, who will communicate with such members, and give them an opportunity to discharge their obligation before being removed from the membership list, as per the terms of the Constitution.

Some discussion took place as to the desirability of offering a prize for a standard for Fastness to Fading, whereby some suitable fading unit for determining the relative intensity of the sun at different periods could be employed.

Some discussion also took place in regard to the desirability of offering a prize for a better type of fading lamp than is at present available. This matter will be more fully considered before the publication of the 1925 Year Book.

Respectfully submitted,
W. E. HADLEY, Secretary.

Applicants for Membership

Active

Blair, Jas. H., superintendent and colorist, Aspinook Company, Jewett City, Conn. Sponsors: K. B. Church and P. Theel.

Clark, David, publisher of Southern Textile Bulletin, Charlotte, N. C. Sponsors: H. M. Chase and C. H. Stone.

Clark, W. J., dyer, Stonewall Cotton Mill, Stonewall, Miss. Sponsors: George G. Wallace and A. R. Thompson, Jr.

Fuhr, Adolf, foreman dyer, Fairy Silk Mills, Shillington, Pa. Sponsors: H. E. Tillson and B. K. Archer.

Hunt, H. M., district manager, Newport Chemical Works, Inc., Greensboro, N. C. Sponsors: T. Taylor and N. R. Vieria.

Jackson, John E., chemist, Lyndhurst, N. J. Sponsors, C. C. Knights and H. Herrmann.

Jacoby, Morris, chemist, Eastern District Piece Dye Works, Brooklyn, N. Y. Sponsors: Stewart F. Carter and Dr. Alfred Pfister.

Jones, C. A., professor textile chemistry and dyeing, Georgia Technical School, Atlanta, Ga. Sponsors, H. W. Ormand and R. W. Arrington.

Long, Robert P., assistant in dye house, Union Bleachery, Greenville, S. C. Sponsors: H. W. Ormand and R. W. Arrington.

Junior

Turkington, S. H., dyer, National Silk Dyeing Company, Dundee Lake, N. J. Sponsors: Ed. F. L. Lotte and C. Walter Lotte.

Voigt, William R., chemist, S. Slater & Sons, Webster, Mass. Sponsors: D. Ferguson and O. H. Forsdale.

Changes of Address

Unterweiser, J. S., Newport Chemical Works, Inc., southwest corner Kensington and Lehigh Avenues, Philadelphia, Pa.

Burke, Henry Barker, 102 Birnie Road, Longmeadow, Mass.

ASSOCIATION BADGES

The lapel button badge illustrated herewith is worn by members of the American Association of Textile Chemists and Colorists.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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INDUSTRIAL RESEARCH

THE synthetic methanol scare has pushed into front page prominence the ever-inspiring subject of industrial research. Modern industry, every branch of it, grew out of research; and just as industry is a product of research, so research is a product of industry. The practice of research, in fact, is so old and so closely related to industry that it has largely lost its original identity, and there has developed a tendency among many of our industries in this country to ignore its basic importance. In the surge of commercialism that characterizes the twentieth century, with the prevailing mania for rapid production and rapid distribution, a large part of American industry has thrust aside this slow, patient old patron, research, and has been grasping at more material and more immediately profitable objectives, often utterly disregarding the more scientific and painstaking methods of industry in other countries.

While in the case of synthetic methanol the consequences to the domestic industry may not prove so deadly as alarmists believe, let us hope that the incident has jolted the indifferent element in industry into a clearer understanding of the necessity for research. "The whole thing will have its value," declared Professor Bogert of Columbia University, "if it is appreciated by American manufacturers and the public as an object lesson of our backward-looking attitude toward research."

Our Government and our universities know the value of research. Their laboratories have produced improvements, processes and products of such vast importance that their actual value to industry and humanity can never be calculated. Can we place a value upon the discovery of saccharin—the substitute for sugar found by Dr. Remsen of Johns Hopkins while engaged in experiments with coal tar derivatives? What would our petroleum industry pay for another discovery of such far-reaching importance as the process for removing sulphur from crude oil—found by Dr. Morse while engaged in research into the nature of petroleum products—a discovery which turned worthless deposits of oil into veritable gold mines? Artificial silk, the lively young member of the textile industry, can trace its short life's history back to years of patient experimentation. Taking a more familiar example, where would the German dye industry stand today in competition with our American industry if it were not constructed upon half a century of chemical research based upon the discovery by an English chemist of a single color?

Every great manufacturing industry stands upon a foundation of comparatively little things discovered by research—a product here, a process there, developed only after months or years of labor. Some industries possess an abiding faith in research and, with eyes ever fixed upon greater advances, realize to the full that when research ceases their very existence will be threatened. Other industries, unfortunately, are not so far-sighted.

We are not implying that all American industry is indifferent to the importance of research. The laboratories of our Government and of our universities do not hold all of America's plodding research workers. Our industries have provided an army of them, and though their names may never echo down through history, their achievements have built the road upon which industry has advanced. But note, these patient workers and this research work are for the most part concentrated *within a few major units* in several basic industries. In these units—in a few far-seeing industrial organizations—research goes on night and day, year after year.

There is the issue—research has been confined to only a few, while the many pursue the dollars before them rather than invest part of their profits in potential wealth and security. The many, lacking the vision of the pioneer, are intent on building elaborate corporations and producing tons of some product that the pioneer has discovered. But the reckoning comes when the pioneer with his research staff turns competitor; and what a momentous commercial fatality results when this competitor is the industry of a foreign nation. Then our efficient sales and distributing organizations, our elaborately ramified manufacturing units, all come to grief in the marsh of stagnation because they were not supported by an adequate research division.

Research may be plainly stated as a preparation for war—commercial war—in times of peace. In view of competitive conditions among the dyestuff, chemical and textile industries of the world, research in these industries has ceased to be a matter of purely scientific experimentation and has been lifted into a place of vital importance from the standpoint of *protection*. While once it may have been allied with idle curiosity, research now stands as a line of defense. For where there are ten who neglect research there is one who has learned the lesson of its tremendous importance; and that one shall progress and triumph, while the ten shall stand still and suffer defeat.

Because commercial rivalry among the nations of the world is becoming an intensive struggle in which only the progressive shall survive, the present time can be

designated as a "psychological moment" for research to stand up and shout for attention from every industry in America. If the appeal for research is ignored here and industrial stagnation and ignominy come as a consequence, industry itself must shoulder the blame and pay the price of its indifference.

OUR EXCLUSIVE INEFFICIENCY

ALL Continental Europe and most of the Asiatic countries now manufacture, buy and sell on the basis of the metric system. The outstanding exceptions to the world-wide adoption of metric measurement are Great Britain and the United States.

The use of the metric system was made legal in the United States in 1866. It has been successfully adopted here in engineering, radio, astronomy, chemistry and a score of other technical fields. The United States Army and Navy and the Public Health Service operate on the metric basis. The system is used in many of our large technical colleges and universities. Its general practice has been emphatically advocated by such leaders in educational, industrial and public fields as Charles W. Eliot, Thomas A. Edison, Henry Ford, General Pershing, Elwood Haynes and John Hays Hammond. The system has been adopted in a number of large manufacturing plants in this country with results that quickly banished any skepticism as to the practicability of the change. The subsequent saving in time and labor in these plants has been enormous.

Although the metric system has been extensively introduced into scientific and industrial circles it is the general adoption of the system by the public at large which has been opposed; and this despite the obvious benefits of a system of weights and measures that would be international in operation. The amount of bewildering labor that industry performs daily in translating its metric calculations into equivalents understood by those who do not work with the system can easily be comprehended. This confusion and inefficiency will continue until the metric system attains unanimous recognition in this country.

Despite contentions of the unprogressive element that opposes the general introduction of the metric system in this country, its adoption would not necessitate expensive changes in manufacturing equipment; it would mainly call for merely a simple change in our present method of expressing length, capacity and weight. Opposition to the system is strangely inconsistent with the usual policy of this country regarding progressive standardization movements. Textile chemists are peculiarly well qualified to appreciate the advantages of its general adoption. They should lose no opportunity to advocate such action.

Ray E. Palmer announces that he has left his position as chemist with the Atlantic Mills in Providence, where he has been for the past year, and is now associated with the Aluminum Company of America, in which connection he expects to travel out of Boston.

"COLOR TRADE JOURNAL" ABSORBED BY "CHEMICALS"

THE May issue of our contemporary, "Color Trade Journal," contains the announcement that this publication has been purchased by the owners of "Chemical Record-Age," and will be merged by them into a single publication to be known as "Chemicals." "Chemicals" will be a weekly publication, but a Dyestuffs Edition will be published every fourth week in which will be included the advertising and text matter which have previously appeared in "Color Trade Journal." The Dyestuffs Edition of "Chemicals" will make its first appearance on May 25th.

While we regret to note the loss in identity of a contemporary established at practically the same time as The REPORTER, we, nevertheless, feel that the merged publication, which is in reality a combination of "Chemical Color and Oil Record," "Chemical Age," "Chemical Engineer" and "Color Trade Journal," will serve the interests of subscribers and advertsiers far more advantageously than any of its constituent units could do.

CORRECTION

In the issue of The REPORTER for February 23, 1925, in the course of the Proceedings of the January meeting of the Southern Section, the following paragraph appeared in a report of a paper read by Charles P. Walker:

"For many years past the word 'Indanthrene' has stood for a superior grade of dyes applied to cotton. Furthermore, it was a trade name covering the products of one dye maker. The trade got to the point of dissociating the name from the maker and associating it with the product. The word 'Indanthrene' now signifies a class of vat colors of a specified fastness and that, the highest, irrespective of who is the manufacturer."

Mr. Walker now wishes us to advise readers of the fact, which is probably well known to them, that only certain special dyestuffs manufactured by some of the constituent units of the Interessen Gemeinschaft are properly entitled to the name "Indanthrene," which is a registered trade-mark. It is, of course, equally well known to our readers that many of the "Anthrenes" of Newport and the "Ponsols" of Du Pont, as well as the products of other manufacturers, are identical with the trade-marked "Indanthrenes."

THE COURT OF CHEMICAL ACHIEVEMENT

Application for the admission of products or processes to the Court of Chemical Achievement, it is announced, may be made up to June 1st. The Court of Achievement will be a leading feature of the Tenth Exposition of Chemical Industries to be held September 28th to October 3rd at the Grand Central Palace. This extension of time has been granted because more time has been requested by the directors of research in the laboratories of industries, government bureaus and educational institutions to choose from their work special items for the consideration of the committee.

Foreign Dyes Imported Through New York and Other Ports During April

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.

B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.

By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.

C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.

K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.

M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilinfabrik Boyer & Kegel, Furstenberg, near Leipzig. Founded 1882.

CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.

CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldorf. Founded 1823

GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.

L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879

tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.

WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.

G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.

I—Gesellschaft fur chemische Industrie. Founded 1885.

S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888

NF—Niederlandische Farben-und-Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.

CN—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)

P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.

BAC—British Alizarine Co., Ltd., Manchester

BD—British Dyestuffs Corporation, Ltd., London.

Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.

CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.

Hol—L. B. Holliday & Co., Ltd., Huddersfield.

Scot—Scottish Dyes, Ltd., Grangemouth.

IMPORTS of coal-tar dyes for the month of April, 1925, by ports are as follows:

	Pounds	Invoice Value
New York	406,385	$392,359
Boston	23,817	13,977
Philadelphia	18,403	17,369
Providence	1,300	1,196
Hartford	1,000	980
Detroit	100	260
Total	451,005	26,141

Five Leading Dyes, by Quantity, Imported During April

	Pounds
Rhodamine B (single strength)	19,110
Indanthrene Blue GCD (single strength)	15,954
Indan. Golden Orange R (single strength)	13,644
Hydron Orange RF (single strength)	10,689
Helindone Red 3B (single strength)	9,972

Per Cent by Country of Shipment

April, 1925

Germany	46	England	6
Switzerland	34	Belgium	3
Italy	6	France	2
Canada	2	Holland	1

March, 1925

Germany	49	England	2
Switzerland	39	Belgium	2
Italy	5	France	1
Canada	2	Holland	—

Dyes Remaining in Bonded Customs Warehouse

	Coal-Tar Dyes and Colors (pounds)	Coal-Tar Intermediates (pounds)
August 31, 1924	507,338	1,081,287
September 30, 1924	559,661	1,111,656
October 31, 1924	552,556	1,050,037
November 30, 1924	553,760	1,031,460

December 31, 1924.....	575,051	1,086,108
January 31, 1925.....	571,371	952,202
February 28, 1925.....	566,038	961,406
March 31, 1925.....	653,020	1,050,539

Imports for First Four Months

1925—	Pounds	Invoice Value
January	403,984	$359,376
February	373,259	365,268
March	527,964	488,501
April	456,005	426,141
Total, four months...	1,761,212	$1,639,286

1924—	Pounds	Invoice Value
January	238,643	$237,868
February	161,869	180,570
March	302,799	307,247
April	176,550	183,789
Total, four months...	879,861	$909,474

The dyes in this report are grouped by Schultz numbers, and in the case of those which could not be identified by Schultz number the classification according to the ordinary method of aapplication was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

DYES OF COAL-TAR ORIGIN*

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
7	Naphthol Yellow S—(I).....	66
10	Stilbene Yellow GGP High. Conc.—(B)..	2,000
11	Chlorazol Fast Orange D—(BD).....	1,385
19	Fast Light Yellow 3G—(By)	
19	Kiton Fast Yellow 3G—(I).....	1,627
22	Supra Light Yellow 2GL—(By).....	439
56	Nitrosamine Red Paste—(B).....	500
118	Brilliant Geranine B—(By).....	200
140	Chromocitronine R—(DH.).....	220
175	Acid Ponceau E—(G).....	330
194	Chicago Red III—(G).....	551
198	Mimosa Z Conc.—(G).....	441
212	Fast Brown G—(Gr-E).....	5
257	Cloth Fast Blue GTB—(I).....	10
273	Blue NA—(C)	
273	Developing Blue 2R—(A)	
273	Diaminogene Blue NA—(C).....	3,471
274	Black Extra—(C)	1,000
279	Benzo Fast Scarlet 8BS—(By).....	200
284	Vesuvine BLX—(B)	100
319	Chloramine Red 3B—(S)	
319	Diamine Scarlet 3B—(C).....	2,200
332	Benzo Fast Red 8BL—(By).....	441
339	Diamine Orange B—(C).....	500
348	Diphenyl Brown BBNC—(G).....	2,205
358	Acetopurpurine 8B—(A)	
358	Chloramine Brilliant Red 8B Conc.—(S)	
358	Chloramine Red 8BS—(By).....	4,201
364	Diazo Brilliant Black B—(By).....	1,753
366	Deltapurpurine 5B—(By)	551
373	Congo Orange R—(By)	
373	Congo Orange R—(A).....	531
379	Benzo New Blue 5B—(By).....	10
392	Direct Fast Orange K—(I).....	881
400	Acid Anthracene Red 3B—(By)	
400	Brilliant Milling Red R—(C).....	300
471	Chloramine Blue 3G Conc.—(S).....	500
476	Cupranil Brown G—(I).....	661
494	Auramine G—(I)	551
503	Brilliant Acid Green 6B—(By)	
503	Erioviridine B Supra—(G).....	3,711
506	Erioglaucine AP—(G)	7,937
516	Crystal Violet Extra Powder—(B).....	200
523	Fast Green Extra Bluish—(By)	
523	Fast Acid Green Extra Bluish—(Gr-E)..	3,397
528	Kiton Fast Violet 10B—(I).....	1,543
531	Eriocyanine AC—(G)	2,500
537	Methyl Lyons Blue—(G)	
537	Methyl Silk Blue New—(G).....	1,953
539	Opal Blue Bluish—(M)	
539	Water Blue Large Lumps—(A).....	625
543	Kiton Pure Blue V—(I)	
543	Poseidon Blue BGX Conc.—(B).....	310
545	Acidol Blue A—(t-M)	
545	Brilliant Acid Blue A—(By).....	541
546	Xylene Cyanol FF Extra Conc.—(S)....	200
548	Acid Violet 6BN—(I).....	441
559	Victoria Blue B Base—(B)	
559	Victoria Blue B Highly Conc.—(B).....	300
562	Brilliant Wool Blue FFR Extra—(By)..	991
564	Erio Green B Supra—(G)	
564	Naphthalene Green Conc.—(M).....	1,343
565	Wool Blue 5B—(Gr-E).....	200
571	Rhodamine 6G Conc. (s. s.)—(G)	
571	Rhodamine 6G Extra (s. s.)—(I)	
571	Rhodamine 6GDN Extra (s. s.)—(By)...	7,310
573	Rhodamine B Conc. (s. s.)—(G)	
573	Rhodamine B Extra (s. s.)—(B)	
573	Rhodamine B Extra (s. s.)—(I).....	19,110
603	Acridine Orange DHE—(DH).....	1,101
606	Phosphine 3R—(Gr-E)	4,000
607	Runic (Rheonine) AL Conc.—(B).....	500
608	Patent Phosphine GRNTN—(B)	
608	Patent Phosphine RRDX—(B)	
608	Euchrysine RRDX—(M)	1,430
613	Quinoline Yellow KT Extra Conc.—(B).	100
618	Ethyl Violet—(B)	500

*This table includes imports through the port of New York to the amount of 406,385 pounds, and also 23,817 pounds through Boston, 18,403 pounds through Philadelphia, 1,300 pounds through Providence, 1,000 pounds through Hartford and 100 pounds through Detroit.

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
627	Chromacetine Blue S Extra—(DH)	441
635	Modern Violet—(DH)	441
637	Gallamine Blue Extra Paste—(G)	7,242
644	Ultracyanine RB—(S)	500
645	Gallazine No. 90—(DH)	110
659	Methylene Blue BGX—(B)	100
660	Methylene Green P Extra—(I)	
660	Methylene Green W—(G)	2,314
663	New Methylene Blue N—(C)	
663	New Methylene Blue N—(M)	1,800
671	Induline Scarlet—(B)	46
672	Azo Carmine GX—(B)	666
681	Direct Gray R Paste—(G)	1,389
681	Malta Gray J—(P)	661
690	Diphene Blue R—(A)	1,000
711	Thional Orange G Conc.—(S)	500
746	Pyrogene Blue Green B—(I)	110
759	Anthraflavone GC Paste—(B)	
759	Anthra Yellow GC Paste—(B)	
759	Anthra Yellow GC Powder (s. s.)—(B)	
759	Helindone Yellow AGC Pdr. (s. s.)—(M)	
759	Vat Yellow GC Paste—(B)	9,796
760	Helindone Golden Orange IC Dbl. Paste (s. s.)—(M)	
760	Vat Golden Orange G Dbl. Paste (s. s.)—(B)	
760	Vat Golden Orange G Dbl. Paste Fine (s. s.)—(B)	
760	Vat Golden Orange G Powder (s. s.)—(B)	5,516
761	Helindone Gldn. Orange IRRT Pst.—(M)	
761	Vat Golden Orange RRT Paste—(B)	
761	Vat Orange RRT Paste—(B)	
761	Vat Orange RRT Paste Fine—(B)	
761	Vat Orange RRTS Powder (s. s.)—(B)	13,644
763	Vat Dark Blue BOA Paste—(B)	2,091
765	Vat Black BB Dbl. Paste (s. s.)—(B)	3,032
767	Vat Violet IRR Extra Paste—(M)	221
778	Alizarine VI Extra Pure—(B)	4,250
779	Alizarine Orange A Paste—(B)	
779	Alizarine Orange AO Paste—(BD)	
779	Alizarine Orange R Paste—(M)	4,178
780	Alizarine Red SV Powder—(B)	
780	Alizarine Red W Powder—(By)	1,800
784	Alizarine Red SX Paste—(B)	
784	Alizarine Red SX Paste—(BAC)	1,746
785	Alizarine Red YCA Paste—(BD)	
785	Alizarine Red YCA Paste—(BAC)	2,842
787	Alizarine Bordeaux BP Paste—(By)	441
792	Cibanone Orange R Paste—(I)	
792	Cibanone Orange R Powder (s. s.)—(I)	6,067
793	Cibanone Blue 3C Paste—(I)	1,542
794	Cibanone Black B Powder (s. s.)—(I)	1,760
795	Cibanone Yellow R Powder (s. s.)—(I)	3,528
804	Alizarine Blue S Powder—(B)	
804	Alizarine Blue S Powder—(By)	2,177
814	Algol Yellow WF Powder (s. s.)—(By)	400
816	Algol Red 2G Powder (s. s.)—(By)	800
817	Vat Yellow RG Paste—(Gr-E)	560
818	Algol Pink R Powder (s. s.)—(By)	400
819	Algol Red FF Extra Paste—(By)	1,197
820	Algol Brilliant Vioet RK Paste—(By)	397
824	Vat Orange R Powder (s. s.)—(By)	880
827	Anthra Bordeaux R Paste—(B)	214
830	Anthra Red RT Paste—(B)	
830	Anthra Red RT Paste—(M)	
830	Anthra Red RT Powder (s. s.)—(B)	2,041
831	Duranthrene Red BN Paste—(BD)	
831	Vat Red RK Paste—(B)	2,358
832	Vat Violet BN Paste—(B)	1,320
833	Helindone Olive IR Paste—(M)	
833	Vat Olive IR Paste—(M)	
833	Vat Olive R Paste—(By)	3,894
834	Vat Gray GK Paste—(By)	798
838	Indan. Blue RS Tr. Pdr. (s. s.)—(B)	1,200
840	Vat Blue 3G Paste—(B)	
840	Vat Blue 3G Paste Fine—(B)	837
842	Helindone Blue ICCD Pdr. (s. s.)—(M)	
842	Indan. Blue GCD Dbl. Pst. (s. s.)—(B)	
842	Vat Blue GCD Dbl. Pst. (s. s.)—(B)	15,954
844	Vat Blue 5G Paste—(B)	
844	Vat Blue 5G Paste—(By)	5,271
849	Indan. Yellow G Paste—(B)	
849	Indan. Yellow G Dbl. Pst. (s. s.)—(B)	
849	Vat Yellow G Dbl. Paste (s. s.)—(B)	8,829
851	Alizarine Leveling Blue B—(C)	500
852	Alizarine Blue IR Powder—(By)	57
854	Alizarine Viridine FF Paste—(By)	1,216
855	Alizarine Sky Blue B Powder—(By)	5,613
858	Alizarine Blue WS—(By)	
858	Alizarine Light Blue B—(S)	
858	Alizarine Light Blue B Conc.—(S)	
858	Alizarine Light Blue SE Conc.—(S)	
858	Alizarine Sapphire Blue B—(I)	
858	Alizarine Sapphirol WSA Powder—(By)	5,563
860	Alizarine Direct Fast Blue BGAOO—(B)	332
862	Alizarine Blue Black B Powder—(M)	
862	Alizarine Blue Black 3B Powder—(M)	4,000
863	Anthraquinone Blue Green BXO Pdr.—(B)	100
867	Anthra Brown B Dbl. Pst. (s. s.)—(B)	2,522
869	Vat Brown R Paste—(B)	
869	Vat Brown IR Paste—(M)	1,873
871	Vat Red Violet RRK Paste—(B)	981
881	Indigo MLB/4B Paste—(M)	1,000
885	Brilliant Indigo B Paste—(B)	3,138
892	Helindone Green G Powder (s. s.)—(M)	1,000
893	Alizarine Indigo G Paste—(By)	397
895	Alizarine Indigo 3R Paste—(By)	400
896	Helindone Blue 3R Powder (s. s.)—(M)	115
901	Ciba Violet R Paste—(I)	7,935
903	Thioindigo Brown 3R Paste—(K)	25
904	Thioindigo Brown G Paste—(K)	25
907	Ciba Scarlet G Extra Paste—(I)	5,400
907	Helindone Fast Scarlet C Paste—(M)	3,000

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
907	Thioindigo Scarlet 2G—(K)	660
908	Ciba Red R Paste—(I)	1,543
910	Helindone Pink AN Paste—(M)	
910	Helindone Pink BN Paste—(M)	3,500
910	Thioindigo Rose BN Extra Paste—(K)	1,200
911	Ciba Orange G Paste—(I)	1,102
912	Anthra Red B Paste—(B)	
912	Ciba Pink B Paste—(I)	772
913	Hydron Orange RF Paste—(C)	
913	Thioindigo Orange R—(K)	10,689
918	Ciba Red 3B Paste—(I)	
918	Ciba Red 3B Powder (s. s.)—(I)	
918	Helindone Reddish Violet IRH Pst.—(M)	
918	Helindone Reddish Violet IRH Powder (s. s.)—(M)	
918	Thioindigo Red 3B Paste—(K)	
918	Vat Red 3B Paste—(M)	
918	Vat Red 3B Powder (s. s.)—(M)	
918	Vat Red Violet RH Paste—(B)	9,972
919	Ciba Bordeaux B Paste—(I)	
919	Ciba Bordeaux B Powder (s. s.)—(I)	1,431
920	Helindone Violet R Powder (s. s.)—(M)	
920	Thioindigo Violet 2B Pdr. (s. s.)—(K)	1,275
923	Fur Brown PR—(Gr-E)	25

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Milling Red G Conc.—(G)	1,653
Acid Milling Yellow G Conc.—(S)	432
Acid Rhodamine 3R—(I)	661
Alizarine Rubinol GW Powder—(By)	1,104
Alkaline Blue H—(Gr-E)	448
Brilliant Acid Blue EG—(By)	100
Cloth Fast Orange G—(I)	220
Cloth Fast Orange R—(I)	205
Guinea Blue A—(Gr-E)	500
Guinea Fast Red BL—(A)	
Guinea Fast Red BL—(Gr-E)	2,400
Guinea Light Blue A—(Gr-E)	100
Kiton Fast Red R—(I)	220
Lissamine Fast Yellow 2G—(BD)	100
Milling Orange G—(Gr-E)	100
Minaxo Acid Brown G—(B)	400
Neolan Blue B—(I)	220
Neolan Blue GG—(I)	2,204
Neolan Green B—(I)	441
Polar Orange R Conc.—(G)	4,409
Polar Red G Conc.—(G)	2,204
Polar Red R. Conc.—(G)	551
Polar Yellow 2G Conc.—(G)	3,131
Radio Green C—(C)	50
Radio Red G, VB—(C)	250
Radio Yellow R—(C)	400
Silk Blue BT 5 BOO Ex. Conc.—(Gr-E)	224
Soluble Carmine—(Q)	500
Sulphon Yellow R—(By)	441
Supramine Yellow 3G, R—(By)	661
Xylene Milling Blue AE—(S)	1,000

Vat Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Vat (Algol) Brown G Paste—(By)	
Vat (Algol) Brown G Pdr. (s. s.)—(By)	3,578
Alizarine Indigo Green B Paste—(By)	397
Anthra Brilliant Green 5G Paste—(B)	459
Cibanone Blue 2G Powder—(I)	220
Cibanone Orange 3R Powder—(I)	771
Grelanone Brown B Powder—(Gr-E)	112
Grelanone Brown RR Powder—(Gr-E)	112
Grelanone Scarlet G Paste—(Gr-E)	560
Helindone Brown IG Powder (s. s.)—(M)	800
Helindone Brown IGG Paste—(M)	1,300
Helindone Printing Black RD Paste—(M)	7,000
Hydron Brown G Paste—(C)	
Hydron Brown G Powder (s. s.)—(C)	
Hydron Brown R Powder (s. s.)—(C)	2,400
Hydron Pink FB Paste—(C)	
Helindone Pink B Extra Paste—(M)	
Algol Brill. Pink FB Paste—(By)	
Anthra Pink B Extra Powder (s. s.)—(B)	5,636
Hydron Pink FF Paste—(C)	
Anthra Pink R Extra Paste—(B)	6,152
Hydron Scarlet 2B Paste—(C)	
Vat Scarlet 2B Paste—(C)	1,661
Hydron Scarlet 3B Paste—(C)	
Hydron Scarlet 3B Powder (s. s.)—(C)	
Helindone Fast Scarlet B Paste—(M)	2,678
Hydron Sky Blue FK Paste—(C)	900
Hydron Yellow GG Paste—(C)	1,550
Hydron Yellow NF Paste—(C)	
Vat Yellow NF Paste—(C)	3,670
Hydron Yellow Brown GG Paste—(C)	100
Hydron Yellow Olive GG Paste—(C)	100
Vat (Indan.) Blue BCS Powder (s. s.)—(B)	6,745
Vat (Indan.) Brill. Blue R Paste—(B)	836
Vat (Indan.) Brown 3R Paste—(B)	840
Vat (Indan.) Green G Paste—(B)	220
Vat (Indan.) Orange 3R Paste—(B)	1,323
Vat (Indan.) Pink B Dbl. Pst. (s. s.)—(B)	5,660
Vat (Indan.) Red 2G Paste—(B)	497
Thioindone Olive B Paste—(K)	25
Vat Scarlet 3B Powder—(B)	165
Vat Yellow GP Powder—(B)	1,000
Vat Yellow GT Dbl. Paste (s. s.)—(By)	176
Vat Yellow 12GL Powder—(Gr-E)	112
Vat Yellow 12GDL Powder—(Gr-E)	224

Mordant and Chrome Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Alizarine Gray G—(M)	1,000

Name of Dye and Manufacturer	Quantity (pounds)
Alizarine Cyanine ND Powder—(By)	25
Alizarine Fast Black SP Paste—(By)	100
Alizarine Fast Gray 2BL Powder—(By)	441
Alizarine Light Gray BS Conc.—(S)	1,789
Alizarine Red PS Powder—(M)	100
Anthracene Bordeaux R Powder—(B)	100
Anthracene Chromate Brown EB—(C)	500
Briliant Chrome Blue 2B Powder—(DH)	110
Chromazurine E—(DH)	441
Chromocitronine 3R—(DH)	110
Chromogene Violet B—(M)	500
Chromorhodine BB, BR, 6GN Extra—(DH)	1,322
Chromoxane Brilliant Blue G—(By)	392
Chromoxane Brilliant Violet SB—(By)	900
Chromoxane Pure Blue B—(By)	750
Eriochrome Azurol BC—(G)	2,205
Eriochrome Blue S—(G)	1,653
Eriochrome Blue SE Supra—(G)	110
Eriochrome Geranole R Conc.—(G)	220
Eriochrome Red R—(G)	551
Eriochrome Violet 3B—(G)	330
Metachrome Olive Brown G Powder—(Bro)	500
Modern Green E—(DH)	220

Direct Dyes

Benzo Dark Brown Extra—(By)	827
Benzo Fast Black L—(By)	997
Benzo Fast Brown RL—(By)	200
Benzo Fast Gray BL—(By)	500
Benzo Fast Heliotrope 2RL—(By)	220
Benzo Fast Orange 2RL—(By)	165
Benzo Fast Yellow RL—(By)	618
Benzo Light Brown 3GL—(By)	110
Benzo Red 12B—(By)	100
Benzo Rhoduline Red 3B—(By)	99
Benzoform Brown 4R—(By)	5
Brilliant Benzo Fast Violet BL—(By)	331
Brilliant Benzo Green B—(By)	518
Brilliant Benzo Violet 2R—(By)	600
Brilliant Congo Violet R—(Gr-E)	100
Brilliant Sky Blue G—(By)	100
Brilliant Sky Blue R—(By)	100
Brilliant Triazol Fast Violet 5RH—(Gr-E)	28
Chlorantine Fast Brown RL—(I)	2,424
Chlorantine Fast Gray B—(I)	661
Chlorantine Fast Violet 5BL—(I)	1,102
Chlorantine Fast Violet RL—(I)	1,102
Chlorantine Fast Yellow 4GL—(I)	1,102
Chlorantine Red 8BN—(I)	1,102
Chlorazol Drab RH—(BD)	700
Chlorazol Fast Brown RK—(BD)	1,500
Chlorazol Fast Eosine B—(BD)	100
Columbia Catechine G—(A)	50
Developed Brilliant Orange 5G Powder—(Q)	331
Diamine Azo Brown G—(C)	220
Diamine Azo Fast Green G—(C)	441
Diamine Brilliant Scarlet S—(C)	1,000
Diamine Catechine 3G—(C)	200
Diamine Fast Bordeaux 6BS—(C)	267
Diamine Fast Orange EG—(C)	200
Diamine Fast Orange ER—(C)	1,000
Diamine Fast Red 8BL—(C)	250
Diamine Fast Red Violet—(C)	100
Diaminogene GG—(C)	220
Dianil Fast Violet BL—(M)	200
Diazanil Pink B—(M)	300
Diazo Brilliant Orange 5G Extra—(By)	300
Diazo Brown G—(By)	200
Diazo Fast Black SD—(By)	100
Diazo Fast Yellow 2G—(By)	1,040
Diazo Indigo Blue 4GL Extra—(By)	117
Diazo Sky Blue B—(By)	25
Diazo Sky Blue 3GL—(By)	105
Diphenyl Fast Gray BC—(G)	550
Direct Brilliant Violet B Powder—(By)	220
Direct Brilliant Violet 2R Powder—(By)	770
Direct Brilliant Fast Violet BL—(By)	405
Direct Fast Heliotrope 2RL—(By)	441
Duranol Blue G Paste—(BD)	320
Duranol Red G Paste—(BD)	344
Fast Cotton Red 8BL—(A)	500
Pyrazol Fast Brown B—(S)	506
Pyrazol Orange G Conc.—(S)	4,001
Rosanthrene RN—(I)	1,102
Rosanthrene Fast Red 7BL—(I)	441
Triazol Pure Green B Powder—(Gr-E)	28
Zambesi Black D—(Gr-E)	500
Zambesi Black F—(A)	200

Dyes for Artificial Silk

Azonine Direct Violet R Conc.—(C)	100
Cellit Fast Blue R—(By)	10
Cellit Faast Brown G—(By)	10
Cellit Fast Orange G—(By)	10
Cellit Fast Red B—(By)	10
Cellit Fast Rubine B—(By)	10
Cellit Faast Violet 2R—(By)	10
Cellit Fast Yellow 2GN, R—(By)	20
SRA Blue IV—(Q)	900
SRA Red I—(Q)	615
SRA Red III—(Q)	900

Rapid Fast Dyes

Rapid Fast Blue B—(Gr-E)	76
Rapid Fast Bordeaux B—(Gr-E)	56
Rapid Faast Brown B—(Gr-E)	20
Rapid Fast Orange BG—(Gr-E)	56
Rapid Fast Pink LB, LG—(Gr-E)	112
Rapid Fast Red B, GL, GZ—(Gr-E)	168
Rapidogen G Paste—(Gr-E)	224

Basic Dyes

Diamond Phosphine R—(C)	1,000
Patent Phosphine M—(I)	1,102

(*Continued on page* 344)

Dyestuff Tables

A List of the Principal American-Made Colors w ith Their Properties and Fastness Characteristics

[NOTE: The publishers of The REPORTER have secured more or less complete data in regard to many of the dyestuffs which are at the present time being manufactured in the United States. As the following material has been brought together from various sources, they realize that errors are quite likely to appear, and it is earnestly requested that any readers who find errors or who are able to give additional information will communicate with the publishers in order that this material may be made as correct, complete and up to date as possible. These tables will appear serially until all colors upon which we have data shall have been covered. The publication of this data was begun in the issue of March 10, 1924.]

CORRECTION

Under the heading of Direct Fast Brown BT (Schultz No. 449) in the Dyestuff Tables published in the May 4th issue of The REPORTER, the name of the Amalgamated Dyestuff & Chemical Company (selling agents, John Campbell & Co.) was omitted as a manufacturer of this color. This firm has been making Direct Fast Brown BT since July, 1924, under the name of Solamidine Brown B.

PONTAMINE FAST BLUE 4GL AND 2GL

(Schultz No. 456)

COMPOSITION: Trisazo.

SPECIALLY SUITABLE FOR: Cotton and cotton-wool unions.

USUAL METHOD OF DYEING: Salt and soda.

SHADE: Navy blue.

SHADE BY GASLIGHT: Duller.

SOLUBILITY: Good.

LEVEL: Dyes level.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Turns slightly redder with mineral acids.
Alkali: Fast.
Chlorine: Destroyed.
Fulling: Moderate.
Ironing: Temporarily redder.
Light: Excellent; fastest direct cotton blue to light.
Mercerizing: Fast.
Rubbing: Fast.
Washing: Moderate.

SENSITIVE TO METALS, LIME: Color excels Diaminogen Blue (S-273) in light fastness.

MACHINE DYEING: Suitable for pad dyeing and mercerizing.

OTHER PROPERTIES: Developed with beta-naphthol, the fastness to washing is not materially improved.

DYED BY OTHER METHODS: With this color in combination with Diamine Fast Yellow (S-617) and Diamine Fast Red (S-343) fashion shades of excellent light fastness may be produced. In combination with Sulphoncyanine (S-257) navy shades of excellent light fastness may be produced on cotton-wool unions.

ON UNIONS: Cotton-wool unions: The cotton is deeper than the wool. Cotton-silk unions: The cotton is deeper than the silk.

DISCHARGING: Discharges white with zinc dust and hydrosulphite.

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co., under names of Pontamine Fast Blue 2GL and 4GL.

DIRECT DEEP BLACK EW EXTRA

(Schultz No. 462)

COMPOSITION: Trisazo.

SPECIALLY SUITABLE FOR: Cotton and cotton-wool unions.

USUAL METHOD OF DYEING: On cotton, with salt and soda. On unions, with 30 per cent Glauber salt.

SHADE: Bluish black.

SHADE BY GASLIGHT: No change.

SOLUBILITY: Good.

LEVEL: Dyes level.

EXHAUSTS: Not clear.

FASTNESS TO:

Acid: Good against acetic acid; bluer with sulphuric.
Alkali: Fairly fast; changes with ammonia or soda.
Boiling: Very moderate.
Chlorine: One deg. Be. bleaching powder totally destroys the color.
Cross-Dyeing: Not suitable.
Fulling: Very moderate. On unions, bleeds strongly into white cotton.
Ironing: Goes greener.
Light: Changes shade strongly on fourteen days' exposure.
Rubbing: Fast.
Steaming: Somewhat duller when steamed for one-half hour at 14½ pounds. Turns brown if steamed for one hour at this pressure.
Sulphur: Moderate.
Washing: Very moderate.
Water: Moderate.

DYED BY OTHER METHODS: Not adapted for after-treatment with chrome, as the shade goes brownish. Not suitable for diazotizing and developing. After-treated with formaldehyde, somewhat faster.

ON UNIONS: Adapted for half-wool. The wool and cotton are dyed the same depth, the wool being greener than the cotton.

ON OTHER MATERIALS: Not suitable for cotton-silk unions or gloria. Wool: Not adapted.

DISCHARGING: Discharges white with zinc dust and hydrosulphite.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., under name of Amanil Black GL; Amalgamated Dyestuff & Chemical Company, under name of Amidine Black E Extra (Selling Agents, John Campbell & Co.); Noil Color & Chemical Works, under names of Direct Black E and Direct Black GXX; Newport Chemical Works, under name of Direct Black EG and Direct Black EE Extra; Calco Chemical Company, under name of Direct Black Extra Conc.; Cincinnati Chemical Works, under name of Direct Deep Black EW; National Aniline & Chemical Company, under names of Erie Black B and Erie Black GXOO; Palatine Aniline & Chemical Corporation, under name of Pacco Direct Black E Extra (Selling Agents, F. E. Atteaux & Co.); E. I. du Pont de Nemours & Co., under names of Pontamine Black E, Pontamine Black EBN, Pontamine Black Extra and Pontamine Black Ex. Conc.; Commonwealth Color & Chemical Company. under name of Trianol Direct Fast Black B Extra.

DIRECT DEEP BLACK RW

(Schultz No. 463)

COMPOSITION: Trisazo.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Salt and soda.

SHADE: Very greenish at first; later redder. Similar to S-436.

SHADE BY GASLIGHT: No change.

SOLUBILITY: Excellent.

LEVEL: Dyes level.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Moderate shade; goes redder.
Alkali: Against ammonia, good. Greener with soda.
Chlorine: Destroyed.
Cross-Dyeing: Not suitable.
Fulling: Same as S-436; moderate.
Ironing: Temporarily greener.
Light: Moderate.
Perspiration: Fast.
Rubbing: Fast.
Sulphur: Moderate.
Washing: Moderate.

MACHINE DYEING: Suitable for pad dyeing.

DYED BY OTHER METHODS: Dyed direct and developed with beta-naphthol the shade is fuller but the fastness to washing is only moderate. Topped with formaldehyde it is faster to washing. It is also well adapted for topping with aniline salt. Other methods of after-treatment give no good results.

ON UNIONS: Cotton-silk unions: Both fibers dyed uniformly. Cotton-wool unions: Cotton heavier than the wool in neutral bath. Wool is greenish in shade. Fast to steaming.

ON OTHER MATERIALS: No interest for wool or silk. Jute: May be used on this fiber.

DISCHARGING: Can be discharged white with zinc powder.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., under name of Amanil Black R; Newport Chemical Works, under name of Direct Black RB Extra; Noil Chemical & Color Works, under names of Direct Black RE and Direct Black RXX; National Aniline & Chemical Company, under names of Erie Black RX and Erie Direct Black RX; Palatine Aniline & Chemical Corporation (Selling Agents, F. E. Atteaux & Co.), under name of Palachrome Direct Black (Red Shade); E. I. du Pont de Nemours & Co., under name of Pontamine Black RX.

ERIE GREEN WT

(Schultz No. 464)

COMPOSITION: Trisazo.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: With salt at the boil.

SHADE: Dull green.

SHADE BY GASLIGHT: Yellower.

SOLUBILITY: Good.

LEVEL: Good.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Good against acetic. Turns bluer with sulphuric.
Alkali: Fast.
Chlorine: Destroyed.
Cross-Dyeing: Not suitable.
Ironing: Turns temporarily bluer.
Light: Moderate.
Mercerizing: Not suitable.
Perspiration: Moderate.
Rubbing: Fast.
Steaming: Moderate.
Washing: Moderate.
Water: Moderate.

SENSITIVE TO METALS, LIME: Copper dye machines, color weaker and duller. Iron dye machines, color unaffected.

OTHER PROPERTIES: Dyes cold; suitable for pad dyeing.

DYED BY OTHER METHODS: After-treatment with copper destroys the shade. After-treatment with chrome turns the shade yellower but does not increase the fastness to washing or light.

ON UNIONS: Cotton-wool unions: Both fibers the same shade. Cotton-silk unions: Both fibers the same shade.

DISCHARGING: Discharges white with hydrosulphite.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., under name of Amanil Green LT; Amalgamated Dyestuff & Chemical Co. (Selling Agents, John Campbell & Co.), under name of Amidine Dark Green N; Noil Chemical & Color Co., under name of Dark Green BG; Consolidated Color & Chemical Company (Sell-

(Continued on page 346)

Technical Notes from Foreign Sources

Rapid Analysis of Glauber Salt

Glauber salt is a reagent used in large quantities in making up various color baths. It is a chemical that the dyer purchases in large quantities. It is necessary that the quality of the sodium sulphate is such that the best results are obtained from it, and in this connection the percentage of impurities contained in the salt is of prime importance. In the crystalline condition the salt often contains impurities, such as sodium bisulphate, common salt, magnesium chloride, calcium chloride and the like, which naturally reduce the effectiveness of the chemical in the color bath, particularly when vegetable fibers are being dyed with substantive coloring matters.

An investigation was made and it was determined that a Glauber salt which will not precipitate neutral Marseilles soap from its aqueous solution can be used with safety in the color bath.

In making this test 2 grams of the soap are dissolved in 100 c.c. of boiling distilled water and 1 gram of the salt that is being tested is added to this solution. The solution must remain clear and no precipitate should appear within a period of twenty-four hours. Even small quantities of the bisulphate or sodium chloride will induce a clouding of the soap solution. (Deutsche Faerber Zeitung, 1924, page 851.)

Alizarine Red on Non-Oiled Fabrics

The usual "oil-prepare" for fabrics before printing by means of alizarine is avoided by the use of a printing paste containing alizarine together with a compound prepared by the action of formaldehyde on Turkey red oil, such that the formation of a color lake does not occur in the printing paste. For further details on this process the reader is referred to the Bulletin Soc. Ind. Muhlhouse, 1924, volume 90, page 555.

Water Absorption of Soda-Boiled Cotton

An interesting paper was recently published in the Journal of the Textile Institute, volume 15, pages 559 to 572, in which a certain phase of the moisture relations of cotton was discussed. This was in connection with the effect of the temperature on the absorption of water by cotton which has been boiled with soda.

In this article there are described an apparatus and a method for the determination of the absorption of water by cotton at all humidities and at temperatures which vary up to 130 deg. Cent. The results obtained for the soda boiled cotton are given. For values of relative humidity less than 80 per cent, the rise in temperature from 10 to 100 deg. Cent. decreases the moisture content at constant relative humidity. With the relative humidity greater than 80 per cent, the rise in temperature from 10 to 50 deg. Cent. decreases the moisture content, but rise of temperature from 60 to 110 deg. Cent. may increase the moisture content of cotton at constant relative humidity. The increase in moisture content which occurs above a temperature of 60 deg. Cent. is probably due to swelling of the cotton fibers and consequent exposure of fresh surface. Hence a temperature of 100 deg. Cent. and a humidity of 100 per cent are the most suitable conditions in technical processes, such as steaming in printing and dyeing which are favored by swelling of cotton, since such swelling is increasingly easier above a temperature of 60 deg. Cent.

Use of Formic Acid in Dyeing

Formic acid is used for many purposes in the dyeing of textile fabrics. For example, in the brightening and dyeing of silken fabrics, particularly the weighted silks, formic acid is much superior to the mineral acids, for these acids have a very bad effect on the tin salts used in the loading process. Formic acid has no such deleterious action. Then again, it is possible to obtain a better and more lasting crash effect in the silken fabric than when acetic acid is employed, and this effect is obtained with a smaller consumption of the acid. Similarly in the dyeing of mixed fabrics, manufactured from silk and woolen fibers, formic acid is very useful. A little Glauber salt may be advantageously added to the acid, and then the mixture can be used for improving the uniformity of the shades obtained with dyestuffs which are known to give irregular colorations. The same mixture may be employed with good advantage in the dyeing of mixed woolen and silken fabrics by means of basic coloring matters. The use of formic acid in this dyeing process renders the subsequent treatment with copper unnecessary.

In the mordanting of woolen fabrics with the aid of potassium dichromate and calcium fluoride, the former acid is much superior to oxalic acid and tartar. The reason for this is that considerably smaller quantities of the acid are able to effect the more complete fixation of chromium oxide than the other acids. For example, in this way with 1½ per cent of potassium chromate and 1½ per cent of a 90 per cent solution of formic acid, it is possible to obtain more lasting colorations than when 3 per cent of potassium dichromate and 2½ per cent of tartar were used. It has also been indicated that formic acid is also superior to lactic acid and sulphurous acid, particularly in that it is able to effect a more uniform reduction than either of these acids.

Another important and advantageous use of formic acid is in the solution of basic coloring matters which are made up into pastes for the printing of cotton fabrics. In this case the formic acid is used in the place of acetic acid. Good results are also obtained with formic acid in

printing silken and wool fabrics with acid dyestuffs, this acid making the fixation of the colors on the fibers a much easier task.

Formic acid may be used to advantage in the place of lactic acid in the dyeing of cotton fabrics, in order to give the fabric a silken handle, and likewise in order to brighten the colors obtained on half-silken fabrics. Formic acid may also be employed to produce lustrous shades on cotton fabric when sulphur dyestuffs are used. Aluminum formate and chromium formate are very useful mordants on woolen fabrics. Finally formic acid in the form of its sodium salt is a very useful antiseptic. (Deutsche Faerber Zeitung, 1924, page 811.)

Dyeing and Printing Fibers

Green to blue shades are produced on fibrous materials, such as textile fabrics, paper, leather hair and the like, by treating the material with hot or cold solutions which contain ferricyanides (or ferrocyanides), a small quantity of acid mercury sulphate, and a reducing agent such as sugar, formic acid, quinol, resorcinol, formaldehyde, dextrine, soluble starch, aniline salts or tannin. This process is patented in British Patent No. 227,906.

Fibrous materials are dyed by depositing metallic oxides on the fibers, by treating the material with hot or cold solutions such as Fehling's solution or analogous solutions, in the presence of reducing agents, such as aldehydes, ketones, sugars, hydroxylamine or hydrazines. The process may be adapted for printing of the solution or the reducing agent is incorporated with a thickening agent. This process is patented in British Patent No. 227,907.

Hydrated Oxide of Alumina and Dyestuffs

An investigation was made to determine the behavior of the hydrated oxide of alumina toward various dyestuffs, and the results of the same were reported in an article published in the Journal of the Society of Dyers and Colorists, volume 41, pages 47 to 53.

In the investigation various samples of hydrated alumina were prepared from aluminum chloride and aluminum acetate, and the action of these on the dyestuffs when the latter were used in aqueous solutions in the presence of electrolytes was examined. Both acid and basis dyestuffs were employed. In the original article there are given the results of quantitative measurements of the absorption by hydrated alumina of basic dyestuffs (Magenta and Methylene Blue) in the presence of sodium phosphate and of acid dyestuffs (picric acid, Naphthol Yellow S, Brilliant Croceine R and 9B, Orange II, Ponceau 2R and Amaranth.

Pure hydrated alumina has no appreciable permanent adsorptive power for basic dyestuffs, and though it adsorbs such dyes in the presence of sodium phosphate the adsorbed coloring matter may be removed by washing with water. The adsorption of acid dyestuffs by hydrated alumina is favored by the presence of chlorine. The mode of preparation of hydrated alumina has less influence on its dyeing properties than is the case with stannic acid and titanic acid. The behavior of hydrated alumina to acid coloring matters is largely determined by the presence of acidic impurities.

Dyeing and Sizing of Ribbons

Ribbons are made from various textile materials. Silk or artificial silk alone may be used for this purpose; mixtures of silk and cotton, of artificial silk and cotton, and finally mixtures of all three fibers may be found in the ribbon. This gives rise to certain difficulties in the sizing and dyeing of the ribbon.

The first step in the process is to singe the ribbons to remove the fuzzy matter present on the surface and then, when the ribbon is made from silk or silk and cotton mixtures, it is necessary to degum the silk. This is accomplished in the usual manner in a bath of Marseilles soap. For half silk ribbon about 2 to 3 per cent of calcined soda and from 7 to 10 per cent of Marseilles soap are employed, and in the case of all-silk ribbons about 25 to 30 per cent of Marseilles soap is employed. The treatment in this bath lasts for two to three hours. Thorough washing is necessary to remove the soap and then the material is ready for dyeing.

The dyeing of straight silk ribbon affords no difficulty and is carried out with the aid of acid coloring matters which will give shades that will meet the ordinary requirements of fastness. In case particularly fast shades are required, fastness to water, to washing and to fulling, it is advisable to use substantitive dyestuffs. On the other hand, when particularly bright shades are required, where the fastness of the color is no object, basic dyestuffs may be used.

The dyeing of ribbons made from silk and cotton fibers offers certain marked difficulties and the attainment of a proper color requires considerable care. Both fibers must be colored the same color tone, but the cotton part must have a darker shade than the silk part. Generally substantitive dyestuffs are employed for this purpose.

The dyeing is carried out in a color bath which contains from 2 to 4 grams of soap, ¼ to 1 gram of soda, and from nothing to 20 grams of Glauber salt per liter. The dyeing is effected at near the boiling temperature. However, when light shades are being obtained, it is more advisable to limit the temperature to about 50 to 60 deg. Cent.

It is very difficult, in fact, possibly only in the rarest cases, to obtain the exact color that is desired both on the cotton and on the silk part of the fabric in the first or bottoming bath. It is most always necessary to treat the ribbon fabric in a second or brightening bath. It is possible to employ well neutralized acid dyestuffs in conjunction with the substantive coloring matters in the bottoming bath. After the dyeing process is completed, it is necessary to wash the fabric very carefully with water, that is, as soft as possible. It is then sent through the brightening bath which is made with the aid of acetic acid, to which is also added a solution of a basic coloring

matter so that the shade of the silken part of the ribbon fabric is brought up in the right manner. Lactic acid has not been found to be as suitable for this purpose as acetic acid, for the former acid has a harmful action on the coloring matter. Other dyestuffs are used in the place of the substantive colors for producing more brilliant shades. (Deutscher Faerber Zeitung, 1925, page 295.)

Extraction of Cotton with Solvents

The importance of the extraction process in comparison with other cleansing processes commonly employed in the treatment of cotton and other textile fabrics is discussed in an article published in a recent number of the Dyer and Calico Printer. It is claimed that the advantages gained with this process are more than sufficient to counterbalance the disadvantages. In the case of wool the important consideration is the recovery of the valuable wool fat. The treatment of wool with the aid of various volatile solvents, such as benzine, carbon disulphide, amyl alcohol, toluene and solvent naphtha, possesses the distinct advantage over the treatment with alkaline soap liquors in that the volatile solvents do not injure the fibers in any way while the soap liquor is apt to have such an action. Then again, when the extraction is carried out under the proper conditions, there should be no loss of reagent, while in the other process both potash and soap are continually lost.

Furthermore, the extraction process may be used to good advantage after the wool has been carbonized.

This process is not so important in the case of cotton, as in this case only waxy and resinous impurities are removed from the fibers, whose separation and refination are operations of considerable difficulty. Then again, the technical value of the products recovered in this manner is very small. Nevertheless, it has been proven that the cotton fabrics which have been extracted with volatile solvents are more easily bleached than others, and the finishing of the fabrics is rendered more easy by the absence of the resinous and waxy ingredients that are present in the cotton fiber.

THE METRIC ASSOCIATION

Specializing in the matter of metric weights and measures, the Metric Association, with headquarters at 156 Fifth Avenue, New York, has extended the scope of its work to include all phases of the weight and measure problem. Information concerning weights and measures, research data, conversion tables, conversion factors, and current news in regard to world standardization of weights and measures is offered as part of its service. In the hope of facilitating the change to the international system, i. e., meters, liters and grams, the association offers this service to members and others. Special investigations are made on request, and reports submitted at cost.

DYES IMPORTED DURING APRIL

(*Continued from page* 339)

Sulphur Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Cross-dye green 2G Conc.—(BD)	4,224
Katigene Indigo CL, GG—(By)	474
Katigene Indigo CL, 5G—(By)	10
Pyrogene Green GK—(I)	1,102
Sulphide Violet V—(M)	100
Sulphur Yellow G Extra—(A)	500
Thionol Brown O—(BD)	2,240
Thionol Brown R—(BD)	6,720

Color-Lake Dyes

Hansa Yellow G Paste—(M)	2,000
Hansa Yellow G Powder—(M)	1,000
Hansa Yellow 5G Powder—(M)	100
Helio Bordeaux BL Paste—(By)	849
Helio Bordeaux BL Powder—(By)	596
Helio Fast Carmine CL Powder—(By)	15
Helio Faast Rubine LBK Powder—(By)	100
Helio Fast Yellow H5G Powder—(By)	100
Helio Fast Yellow H10G Powder—(By)	50
Paper Fast Bordeaux B—(By)	441
Stone Fast Yellow GG Lumps—(B)	200
Stone Fast Yellow GN Lumps—(B)	500

Unclassified Dyes

Setacyl Brilliant Pink G—(G)	55
All other dyes—(Q)	3

Color Lakes of Coal-Tar Origin

Name of Lake	Quantity (pounds)
Alizarine Lake RLS	400
Azure Blue Powder	1,250
Blue Lake Powder	220
Brilliant Lake PB Powder	220
Madder Lake 79 Extra	500
Madder Lake VN 14 Powder	800
Madder Lake Z Powder	25
Madder Red Powder	602
Permanent Yellow G Powder	50
Phloxine Lake IB Powder	502
Printing Red	10,141
Violet K Powder	100
Viridine H Powder	850

In a recent announcement of the organization of the Amdyco Corporation (a new company which is selling Amdyco foam stabilizer used in making foam to extinguish oil fires) the parent company was described as the American Dyewood Company, a subsidiary of the American Dyewood Corporation. This statement was incorrect. The American Dyewood Company is a subsidiary of the *United* Dyewood Corporation. There is no American Dyewood *Corporation*.

DYEING ACETATE SILK

(*Continued from page* 318)

with salt alone, in which case the shade is bluer and weaker. In the latter case, on unions, it gives a lavender shade on the Lustron and a dull blue on the cotton. The fastness to light is excellent and good to acids, alkalies, washing and rubbing.

Method No. 41: *Alizarine Dyes on Lustron.*—While it has been stated that acetate silk could not be mordanted, the Lustron Company state that it may be given an aluminum mordant by treating it overnight in 8 parts of 8 to 10 deg. Tw. aluminum acetate and 2 parts glacial acetic acid. In the morning wring well or hydroextract, rinse *once lightly* and then dye with Alizarine or other suitable mordant dyes, and finally treat with Turkey Red oil, soda and ammonia.

As with "C. R." cotton dyes there are many "C. R." acid and mordant dyes and these will be discussed later. There is, in fact, a complete line of "C. R." dyes for wool.

(Part VI will appear in an early issue)

DU PONT ANNOUNCES THREE NEW PRODUCTS

E. I. du Pont de Nemours & Co. have put on the market two new chrome colors, Pontachrome Fast Yellow GW and Pontachrome Fast Yellow RW. These colors are characterized by their extra fastness to light, and also have the property of leaving silk white. They are recommended for use in combinations for the dyeing of browns, tans and mode shades. Their fastness to washing, water, fulling, perspiration, alkali and acids is described as excellent. Fastness to stoving, however, is only moderate and fastness to cross dyeing very good.

The third new product announced is designated Sulfogene Brilliant Blue 6BS. This product is easily soluble and has good general fastness to light, acids, alkali, soap, perspiration, severe washing and boiling water. It is described as fairly fast to dry stoving and street dirt. However, this color is decolorized by chlorine. It is a product particularly useful for padding bright shades of greenish blue.

THREE NEW CIBA COLORS

Three new colors are being offered to the trade by Ciba Company, Inc. They are products of the Society of Chemical Industry in Basle.

Chlorantine Fast Green BL is described as the fastest to light direct green, and takes its place in the well-known group of Chlorantine fast colors. It is suitable for cotton, artificial silk, calico printing, silk, half silk and half wool. Paper and lake manufacturers may use this new shade to produce a green of a purity unobtainable with mixtures of other fast-to-light dyestuffs.

Brilliant Acid Blue G is a new acid wool dyestuff of exceptional bright greenish blue shade, which is said to possess the valuable property of retaining its tone in artificial light. It is recommended for wool, wool-silk unions, silk, and wool and silk printing.

Benzyl Fast Blue L is characterized by good fastness to light. It is especially suitable for wool piece dyeing, as in addition to good fastness to light it possesses good fastness to alkali, washing, perspiration, decatizing and carbonizing. It is likewise of value for the dyeing of silk, silk-wool unions, half wool dyeing, and wool and silk printing.

EXHIBITION OF STUDENTS' WORK

The annual exhibition of students' work was held on May 4th at the Textile Department of the North Carolina State College, Raleigh. This exhibit, held in the Textile Building, was seen by over two thousand visitors. All the machinery was shown in operation by the students—carding, spinning, weaving and dyeing. Visitors were each presented with a souvenir of the occasion, a badge depicting a young lady holding in her hand a banner with the word "Textile" and the class numerals "1925" woven into it, the work of one of the students graduating in June. Members of the senior class acted as guides, conducting the visitors around the building and explaining in detail the different processes of cotton manufacturing.

Considerable interest was shown in the display of finished products, which included dress goods, shirtwaistings, table covers, narrow fabrics, terry towels and other products of the loom. Rayon products on display received very favorable comment from the visitors.

CHANCE FOR CHEMICAL ENGINEERS TO BRUSH UP

Chemical engineers who have been out of college for some years and who feel the need to brush up on their fundamentals of chemical engineering methods, will be given the desired opportunity this year at the Chemical Exposition which will be held September 28th to October 3rd at the Grand Central Palace, New York. A special course in chemical engineering which will be given in conjunction with the exposition, will be divided into two groups, Section One for college students, and Section Two for advanced students, graduate students, and engineers of industry who are desirous of reviewing their work. Lectures will be given by leading authorities in the various fields and will cover fundamentals and advanced work in engineering. Prof. W. T. Read of Yale University will have charge of the complete courses. Lectures will be held in the Grand Central Palace and tours of the Exposition for demonstrations will be conducted after the lectures. Entries for the course should be filed with the management, Chemical Exposition, Room 1102, Grand Central Palace, New York. The course is without charge.

DYESTUFF TABLES

(*Continued from page* 341)

ing Agents, H. A. Metz & Co.), under name of Direct Dark Green C; National Aniline & Chemical Company, under name of Erie Green WT.

CHLORAMINE GREEN B

(Schultz No. 470)

COMPOSITION: Trisazo.

SPECIALLY SUITABLE FOR: Cotton and half-wool.

USUAL METHOD OF DYEING: With Glauber salt.

SHADE: Clear shade of green.

SHADE BY GASLIGHT: No change.

SOLUBILITY: Very good.

LEVEL: Dyes level.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Fast.
Alkali: Fast.
Chlorine: Moderate.
Ironing: Fast.
Light: Moderate; same as the Benzo Greens.
Perspiration: Fast.
Rubbing: Fast.
Washing: Moderate; average for benzidine colors.

OTHER PROPERTIES: Suitable for pad dyeing.

DYED BY OTHER METHODS: Dyed on cotton, the shade of Chloramine Green is clearer and stronger than Benzo Green BB. It is also more suitable for cotton-wool unions than the latter.

ON UNIONS: Cotton-wool unions: Suitable. Cotton-silk unions: Suitable.

ON OTHER MATERIALS: Silk: On silk, dyeings fast to water and fairly fast to soap are obtained.

DISCHARGING: Can be discharged a cream shade with tin salt or sulphoncyanide of tin. Discharges white with zinc dust. Combined with oxidizing agents, it can be used for green discharge of dischargeable mordant colors.

COMPETING PRODUCTS: Made in the United States by Amalgamated Dyestuff & Chemical Company (Selling Agents, John Campbell & Co.), under name of Amidine Green BB Supra; American Aniline Products, Inc., under name of Chloramanil Green B; Newport Chemical Works, under name of Direct Green 2GB; Palatine Aniline & Chemical Corporation (Selling Agents, F. E. Atteaux & Co.), under name of Pacco Green GB.

Arthur Krell, director of the Badische Anilin & Soda Fabrik, arrived here on a short business trip and will make his headquarters in the office of Kuttroff, Pickhardt Company, agents for the company.

THREE NEW NEWPORT COLORS

Newport Direct Sky Blue FFG, Direct Brown N3G and Direct Green 2GB Extra are three new colors announced by the Newport Chemical Works. Insert sheets for the Newport binder have been issued describing these colors in detail. Sample swatch bows showing these shades are attached to the inserts and the application, notable properties, fastness properties and other information regarding each color are given.

Newport Direct Sky Blue FFG, an exceptionally green type of Direct Sky Blue FF, is particularly suitable for dyeing upholstery materials, draperies, etc., when subjected to an aftertreatment with copper sulphate, which renders it of excellent fastness to light. When dyed straight it produces very clear bright sky blue shades or may be used in combination to produce bright greens.

Newport Direct Brown N3G is recommended for the production of tans and browns where low cost is necessary; as it exhausts easily it is particularly suitable for padding. It is said to have good fastness to light for this class of color, and excellent fastness to rubbing, hot pressing and steaming. Its fastness to washing is described as moderate, while its fastness to cross dyeing is good.

Newport Direct Green 2GB Extra dyes level and exhausts evenly, making it particularly good for dyeing piece goods and raw stock, as well as yarns. Its fastness to light is described as good and its fastness to rubbing, hot pressing and steaming as excellent. Fastness to washing and cross dyeing is moderate.

CHEMIST

Chemist, technical school graduate with three years' textile laboratory and plant experience desires connections with progressive concern. Address Box 299, American Dyestuff Reporter.

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As bleacher or assistant superintendent in print works or finishing plant. Sixteen years' practical experience. A1 references. Address Box 300, American Dyestuff Reporter.

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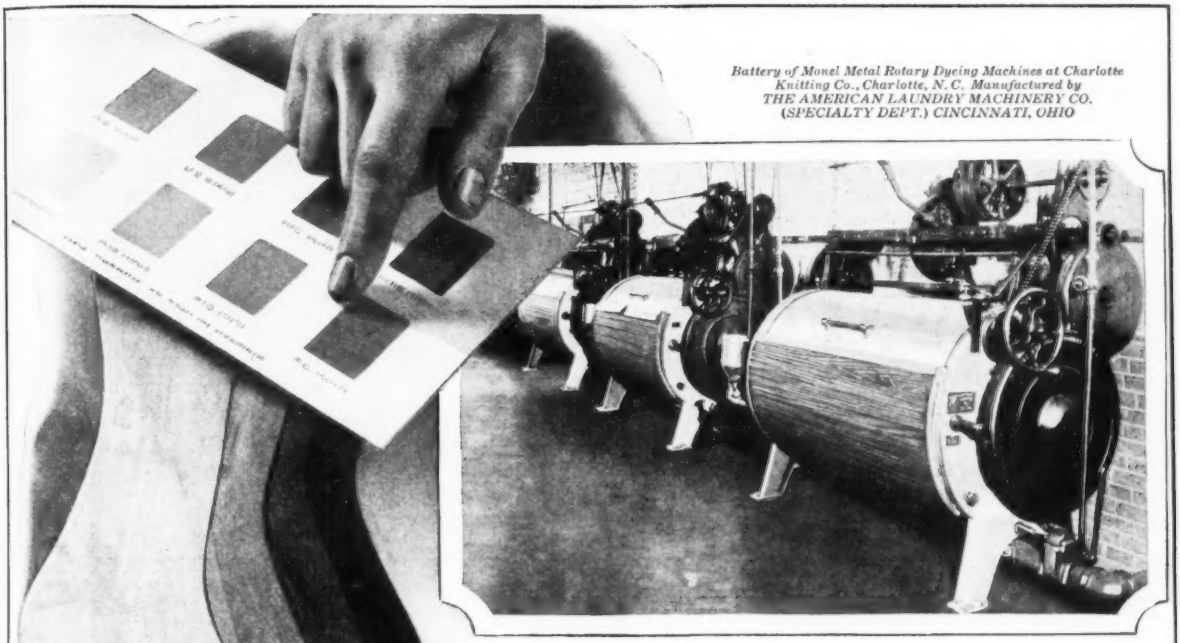
WANTED—An experienced, high-grade dyestuff salesman, with executive ability, for the handling of a Southern territory. Reply confidentially, giving age, experience, salary desired, etc. Address Box 301, American Dyestuff Reporter.



Battery of Monel Metal Rotary Dyeing Machines at Charlotte Knitting Co., Charlotte, N. C. Manufactured by THE AMERICAN LAUNDRY MACHINERY CO. (SPECIALTY DEPT.) CINCINNATI, OHIO

FOR the exact color, at low cost, *specify Monel Metal for dyeing equipment*

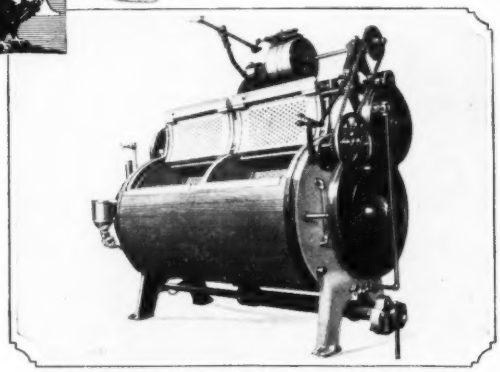
THE boss dyer in the small hosiery mill must be as watchful of costs and quality as the dye-house superintendent in the million-dollar plant. In these days of delicate shades for hosiery, the problem of obtaining correct colors, at no greater manufacturing cost, is a vexing question to every mill that is not Monel Metal equipped.

Here at the Charlotte Knitting Co., three Monel Metal machines handle hose of mercerized cotton, pure silk, artificial silk—and combinations of the three. With just a short boil-out between batches, these machines shift from one color to another, with no losses due to color "hangovers."

The unique combination of properties embodied in Monel Metal is responsible for such profitable operation. Corrosion-resistance, rust immunity and steel-like strength—all in one metal—provide a dyeing equipment material which has no equal.

Many other items of dye-house equipment—tubs, ladles, dippers, scoops, pails, etc.—these are now available in Monel Metal. Ask your sheet-metal worker!

Dig into this question of better profits from better equipment. Get the facts. *Write today.*



"American" Monel Metal Rotary Dyeing Machine of the type installed at Charlotte Knitting Co., by the AMERICAN LAUNDRY MACHINERY CO. (SPECIALTY DEPT.) CINCINNATI, OHIO

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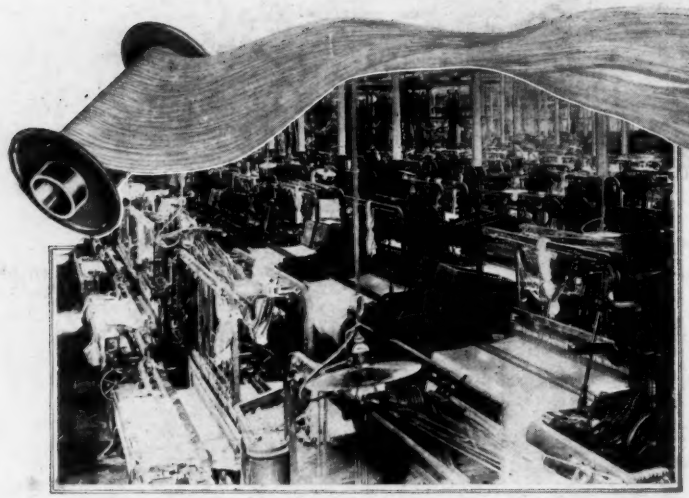

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